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DEFENDING HALIFAX: ORDNANCE, 1825-1906

A.J.B. Johnston

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Cover: Hauling a 10-inch RML from the dock up to York Redoubt, ca. 1873. (*The Army Museum, Halifax Citadel*.)

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ABSTRACT

From the middle of the 16th to the middle of the 19th century, land and sea battles around the world were fought largely with what is known as smooth-bore ordnance, cannons cast in either iron or bronze. While advances emerged from time to time in different countries, such as the development of ever more deadly projectiles, or the introduction of traversing gun platforms, all such advances were quickly and easily adapted by rival countries. In general, it was an era of widely shared, basically unchanging weapons technology. To illustrate, an artilleryman active in the defence of England from the Spanish Armada in 1588 probably would have had little difficulty in operating the smooth-bore pieces used in the Crimea in 1854-56, or for that matter the armament mounted on the Halifax Citadel during the mid-1850s. Commencing with the successful development of rifled ordnance (rifled breach loaders or RBLs) in the late 1850s, however, a new period of unprecedented and apparently unceasing change in armament technology commenced. By the end of the 19th century, only four decades after the start of the new era, guns had been developed weighing eight times as much as the heaviest smooth bores and firing much heavier and more explosive projectiles ten times as far with a vastly improved accuracy.

One of the principal ramifications of such rapid progress in ordnance technology was that both fortifications and approaches to warfare developed during the smooth-bore era had to be entirely rethought, not once but several times. This was particularly true in coastal defence where successive improvements in the construction and arming of contemporary naval vessels repeatedly rendered existing defences obsolete. In Halifax, frequent reassessments of the defences by British military strategists were often followed by large-scale construction and reconstruction of the forts and batteries around the harbour. This massive task began in the early 1860s and continued virtually until the British troops withdrew in 1905-6. While the attention of the imperial authorities was focussed increasingly on the outer harbour defences as the years went by, the need to update the Citadel's ordnance was not overlooked. During the 1860s and 1870s the old masonry fort passed through two separate phases of rearmament. By the end of the second phase the perceived role of the Citadel had obviously changed. Whereas in the smooth-bore era the fort had been regarded as Halifax's main defence against a land attack, during the rifled era the selection and location of new pieces to be mounted in the work revealed that the Citadel was being considered as a virtual sea battery.

The purpose of this report is twofold: first, to describe and assess the impact the series of developments in armament during the latter half of the 19th century had generally on the defences of Halifax and second, to trace the history of the Citadel's ordnance in two markedly different eras, smooth bore (1825-60s) and rifled (1860s-1900).

This approach has been adopted so that this aspect of the Citadel's history will not be seen in isolation but set in the wider context of British imperial policy for all of Halifax.

Submitted for publication 1977, by Andrew John Bayly Johnston, Parks Canada, Louisbourg, N.S.

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I would like to point out that without the mass of important material obtained by Richard J. Young during his 1977 research trip to Great Britain, much of the analysis in this report of the period from 1860 to 1906 would not have been possible. I would also like to thank Mr. Young for his many excellent suggestions on armament matters, and Cameron Pulsifer for uncovering key documents on Citadel ordnance that I had overlooked.

THE GUNS OF HALIFAX (1825-1906)

The story of the fortifications of Halifax, as with so much else relating to the city's history, revolves around the harbour. In 1749 it was the size, location and defensibility of the anchorage that led the British to establish the initial fortified settlement there. In the years that followed, until 1906, it was the continuing strategic value of the harbour that prompted them to construct an evolving network of defences to deter or deflect possible enemy attacks.

The British approach toward fortifications during the century and a half in which they garrisoned Halifax can be discussed in terms of two distinct phases. During the first phase, which lasted from 1749 to the early 1820s, the British generally turned their attention to the defences of Halifax only when attacks seemed imminent. Hence, each of the major wars of the period, the Seven Years' War, the American Revolution, the war with Revolutionary France and, to a lesser extent, the War of 1812, witnessed flurries of activitity as existing works were renovated and new ones established. As soon as peace was declared, however, the British cut off expenditures on fortifications and largely ignored the defences until the next war. The neglect, combined with the influence of the maritime climate, quickly rendered unserviceable the earth and timber constructions of this era. At last, in the mid-1820s the British changed their approach toward the Halifax fortifications. The new approach, which was to make its influence felt until 1905, was characterized by a willingness to spend relatively large sums of money on the defences in peacetime to ensure that Halifax could withstand any likely attack. Initially, the change in attitude brought about the construction of the fourth Citadel; during the latter half of the 19th century and the early years of the 20th, it manifested itself in a series of British decisions to expand and rearm the defences whenever strategic and technological considerations made such modifications imperative. It is with this second phase in the history of the Halifax fortifications, as it affected armament, that this report is concerned.

1825-60: Smooth Bores

When Great Britain and the United States signed the Treaty of Ghent to end the War of 1812, there were few people on either side of the Atlantic who believed that the peace would be lasting.[1] There had been two Anglo-American wars within 40 years and another conflict seemed probable, if not inevitable. Notwithstanding the treaty and the subsequent Rush-Bagot agreement (1817) to demilitarize the Great Lakes, each side remained highly suspicious of the other's territorial and commercial aspirations in North and Latin America. The mutual suspicion and hostility would last until the end of the 19th century, shaping strategic thinking in both Britain and the United States.

In 1825 the likelihood of another Anglo-American war prompted the Duke of Wellington, in his capacity as Master-General of the Board of Ordnance, to send a commission of three Royal Engineers to British North America to evaluate existing defences and make recommendations for improvements.[2] The commission, headed by Sir James Carmichael Smyth, arrived in the colonies in the summer. In September, after completing their inspections of forts in Upper and Lower Canada, they arrived in Halifax where they toured the fortifications in the company of Gustavus Nicolls, the Commanding Royal Engineer (CRE). The recommendations resulting from these investigations and their eventual, partial acceptance by the British Parliament[3] were to be the most important influence on the Halifax Defence Complex for the next 30 years.

The recommendations put forth by the Smyth Commission concerning the Halifax fortifications were predicated on the belief that in the event of a war with the United States the success or failure of the British war effort would hinge upon the offensive use of seapower. The report repeated the conventional wisdom that a land attack from the Canadas upon the United States was utterly impractical. On that frontier "we can only act upon the defensive." By way of contrast, the commissioners argued that a naval attack (with 25,000 troops) upon the New York area, if conducted quickly and with secrecy, "could never be dislodged ... could not fail of success."[4] In addition to an actual invasion, a coastal blockade of American ports would once again be a key feature of British strategy, as it had been during the American Revolution and the War of 1812. In such an approach to war with the United States, the strategic importance of Halifax, with its world-class harbour, naval yard and onshore military establishment, was obvious. It was "the principle point to defend" as it would be the "ultimate object of any attack upon Nova Scotia."[5]

The Smyth Report envisioned two probable types of attack on Halifax: a direct naval assault on the harbour defences and an overland attack by a force that had landed at a nearby anchorage, such as St. Margaret's Bay. With respect to the former possibility, the commissioners commented that there were six "very good Sea Batteries" protecting the harbour as well as the fortified position of York Redoubt (Fig. 1). While they were generally pleased with the positioning of the harbour defences, they did worry that an enemy fleet might force its way past York Redoubt and Northwest Arm Battery and then sweep down the Arm. Once that was accomplished they could "turn all the Coast Defences of Halifax, and if in superior force, might take possession of the Town and Dock Yard forthwith." To defend against that threat, the commissioners made two suggestions. First, Sherbrooke Tower on Maugher Beach should be completed so that it could cooperate with York Redoubt in covering the outer reaches of the harbour. Second, they recommended that Northwest Arm Battery be "augmented" to provide greater fire on the entrance to the Arm. For the general defence of the harbour the report suggested that Fort Clarence needed to be "strengthened" due to its isolation on the Dartmouth shore and that the unfinished work at Fort Charlotte on George Island be completed.[6] Although the commissioners did not explain what they meant by "strengthen" and "augment," it seems reasonable to assume that along with a general

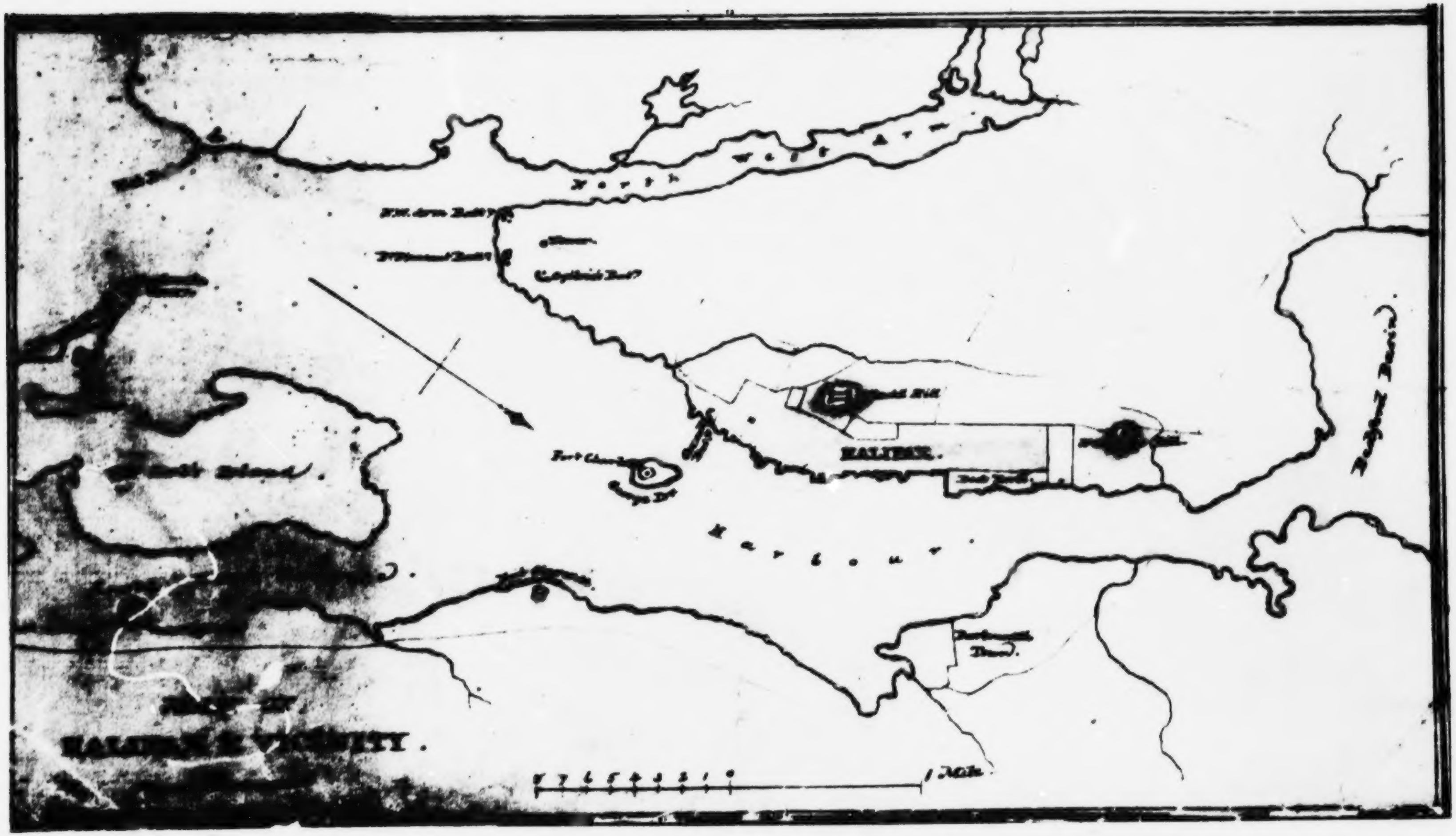
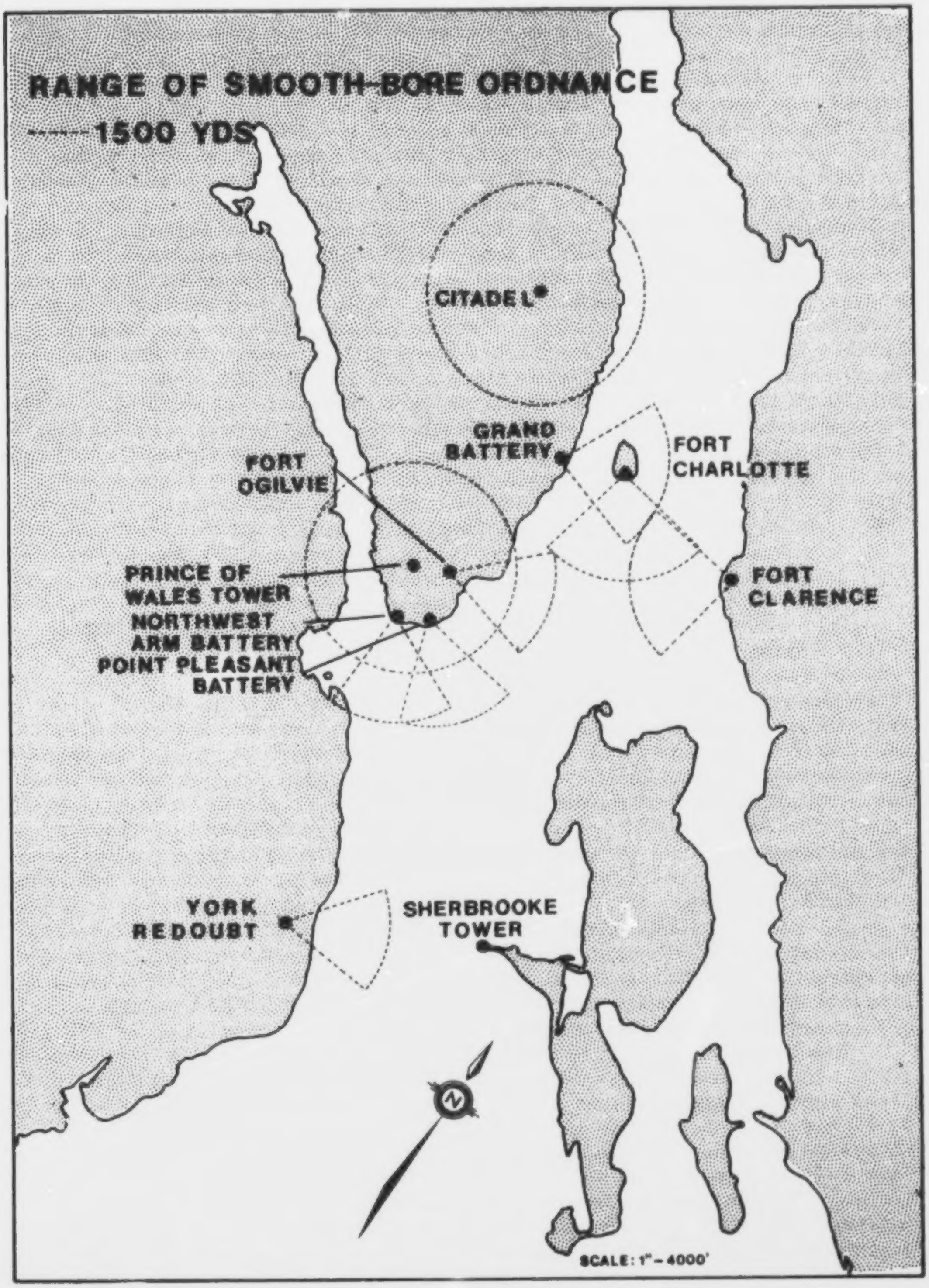

North West Arm
Harbour
Halifax
Fort Charlotte
Bedford Basin
Dartmouth
1 Mile
Halifax & Vicinity.

Figure 1. Fortifications of Halifax (1825). "Outline map to illustrate a Report to His Grace the Duke of Wellington relative to his Majesty's North American Provinces" (1826). This map was inset in a large map of British North America drawn to illustrate the provisions recommended in the Smyth Report. It shows clearly the location and shape of the 10 forts and batteries composing the defence complex throughout the 1820-1850s. In addition, the map indicates why the Smyth Commission felt that fortifications should be established on Needham Hill to cooperate with a work on Citadel Hill in the landward defence of the town. Finally, notice the relatively small extent of land occupied by the town of Halifax in the early decades of the 19th century. (*Public Archives of Canada, National Map Collection.*)

Figure 2. Range of smooth-bore ordnance (ca. 1861). The arcs on this illustration indicate the approximate effective ranges of the ordnance mounted in the Halifax fortifications ca. 1861, with the exception of Sherbrooke Tower whose guns could not likely have been fired very effectively. Each arc represents 1500 yards from the fort or battery in question, a distance at which one contemporary expert claimed that "under the most favourable circumstances 75 or 80 out of 100 shots from good smooth-bored guns would hit a large ship ...". At 2000 yards the gunner's accuracy dipped to 45 per cent. The same authority, Major Miller, stated that a trained crew could fire one round per minute with heavy smooth bores that were well mounted and worked; "on this calculation each gun in a coast battery might be fired five times at a ship moving past at 12 knots an hour, supposing the ship to be at 500 yards distance, when nearest to the battery, and the gun to traverse sixty degrees right and left of a line perpendicular to its course."


RANGE OF SMOOTH-BORE ORDNANCE
------ 1500 YDS
CITADEL
GRAND BATTERY
FORT CHARLOTTE
FORT OGILVIE
PRINCE OF WALES TOWER
NORTHWEST ARM BATTERY
POINT PLEASANT BATTERY
FORT CLARENCE
YORK REDOUBT
SHERBROOKE TOWER
N
SCALE: 1" - 4000'

renovation, they were proposing either heavier ordnance or an increase in the number of pieces for each of the sites where they used those terms.

After discussing the defence complex's capability against a sea attack, the Smyth Report then turned to its ability to resist an overland attack. The commissioners pointed out that if an enemy force landed at a nearby bay, it could only approach Halifax via the narrow isthmus. "This ground ... is not more than a mile and a half in width, offers very great facilities for a defensive position, and is well calculated to arrest an Enemy's further progress."[7] Presumably, although they did not specify, they envisioned the establishment of a number of temporary earthworks and batteries on the peninsula to impede progress across the isthmus. If those positions were forced, "a very excellent and prolonged defence might still be made from the Citadel and Needham Hills, which would mutually assist and prevent the complete investment of each other."[8] Unfortunately, in 1825 the fortifications on each of those hills were in ruins.[9] In the commissioners' eyes new works had to be erected on both if the British hold on Halifax was to be made secure.[10] Of the two positions, they perceived a more diversified and more important role for Citadel Hill.

> "It appears ... self-evident that this hill should be held as a protection to the town, as a support to the Sea Batteries, to give confidence to the Troops and Militia employed to meet an advancing Enemy, and to enable the General Officer in command to move to any other part of Nova Scotia with his disposable force ... without exposing his stores and supplies of every description to be taken or destroyed."[11]

Having stated what they felt to be the raison d'etre for a large-scale renovation of the Halifax defences, the Smyth Commission went on to criticize the traditional policy of erecting only "temporary expedients" at times of war.[12] They felt that what was needed were substantial, permanent forts, built in peace with an eye to future wars. "A million laid out in time of Peace, with judgement, will unquestionably be the cause of saving millions hereafter to the Country."[13] The total estimated cost of all the works proposed by the Smyth Commission for the Halifax Defence Complex was placed at £206,000, a relatively small figure if it ensured that Halifax remained in British hands. The commissioners suggested hopefully that the very knowledge of the existence of permanent forts and of "our own state of preparation for defence, doubtless, will tend to delay, if not altogether avert the calamities of War."[14]

The Smyth Report was submitted to the imperial government in late 1825. In December, Gustavus Nicolls, the CRE in Nova Scotia, forwarded plans and estimates for one of the proposed defences, a masonry bastioned fort on Citadel Hill. The CRE estimated that it would take six years and nearly £116,000 to construct the new Citadel. For the next 2 1/2 years Colonel Nicolls' plans and the Smyth Report followed a tortuous course through the various levels of the British bureaucracy.

As part of the review process Nicolls was called upon to provide greater detail on the need for the works proposed in the Smyth Report. In June 1827 he forwarded his reply. In his discussion of both the land and sea defences of Halifax, Nicolls supported the conclusions of the Smyth Commission but elaborated on specific works that were required. In general, he revealed a somewhat amazing penchant for towers. He agreed that the weak point in the sea defences was the Northwest Arm. However, he did not believe that the completion of Sherbrooke Tower on Maugher Beach and the strengthening of Northwest Arm Battery would be sufficient. Nicolls suggested the addition of a new battery with very heavy ordnance (six 32-pounder guns and three 68-pounder carronades) between Northwest Arm and Point Pleasant batteries as well as the construction of another tower. Turning to the land defences the CRE recommended that, in addition to a masonry fort on Citadel Hill, two towers should be erected on the isthmus, one on Needham Hill and yet another on Fort Massey Hill to the south of the Citadel. To protect the isolated Fort Clarence Nicolls urged the construction of two more towers.[15] In September 1827 Sir James Carmichael Smyth reported to the Board of Ordnance that he concurred completely with Nicolls' analysis and with the measures he had proposed.[16]

At last in July 1828 approval was given for the construction of a masonry fort on Citadel Hill, as proposed by Gustavus Nicolls in 1825. That same year Sherbrooke Tower was finally completed.[17] The other projects advocated by the Smyth Commission, and subsequently by Nicolls, were simply set aside. Nonetheless, the decision on the Citadel represented by itself a significant shift in the British attitude toward the Halifax fortifications. The imperial authorities had accepted the general principle that it was better strategy and ultimately less expensive to construct permanent works in peacetime than to erect "temporary expedients" whenever war broke out.

The building of the new Citadel began in earnest in 1829. If the work had proceeded as the CRE originally planned, it would have been completed in 1834 or 1835. As is well known, it did not go as Gustavus Nicolls hoped. The combined effect of the Halifax climate, engineering miscalculations and administrative delays in Great Britain extended the length of the project into the 1850s. One of the results of that concentration of attention and money on the Citadel project over so many years was that there was very little attention paid to the renovation or even basic upkeep of the other key sites in the Halifax area. Not surprisingly, given that most of them consisted of earthwork and timber construction, there was a marked deterioration in the overall defensive capability of Halifax's fortifications between the 1830s and the 1850s. Whereas in 1825 there were 83 pieces of ordnance mounted (Table 1), excluding the towers whose armament was not listed,[18] in 1834 there were only 58 pieces mounted in the entire defence complex, including the towers (Table 2).[19] The Point Pleasant defences were the hardest hit by the negligence. Fort Ogilvie and Prince of Wales Tower were completely without armament in 1834 and Point Pleasant Battery was left with only one 12-pounder gun. On the Dartmouth shore, Fort Clarence's armament stood at only four guns, compared with 30 in 1812[20] and 11 in 1825. By 1852 the situation had changed little (Table 3).[21] While the number of pieces mounted had increased to 97, the CRE and CRA (Commanding Royal Artillery) considered only 63 to be in a serviceable state. The sites in the worst state of disrepair were Fort Charlotte (with only 13 of 25, 24-pounder guns "serviceable") and Fort Ogilvie (where all of the mounted ordnance was "condemned"). In addition to the unserviceable ordnance there were 43 pieces dismounted. The overall situation in 1852, therefore, was 63 serviceable pieces and 77 unserviceable or dismounted. It was the

Table 1. Mounted Ordnance (1825)[158]

	Guns						Carronades		Howitzers		Mortars		
	68-pr	8 in.	32-pr	24-pr	18-pr	12-pr	24-pr	12-pr	10 in.	8 in.	13 in.	8 in.	Total
York Redoubt				8									8
Sherbrooke Tower													
Point Pleasant Battery				10									10
Northwest Arm Battery				6									6
Fort Ogilvie				6									6
P.O.W. Tower													
Fort Clarence				11									11
Fort Charlotte				30									30
Grand Battery			9						2			1	12
Citadel													
Total			9	71					2			1	83

Note: Armament for towers was not listed. Therefore, the total number of pieces mounted was probably higher. The type of mortar mounted in Grand Battery was not described in the armament listing. It could easily have been smaller than the 8-inch pattern but was not likely any larger.

Table 3. Mounted Ordnance (1834)[159]

	Guns						Carronades		Howitzers		Mortars		
	68-pr	8 in.	32-pr	24-pr	18-pr	12-pr	24-pr	12-pr	10 in.	8 in.	13 in.	8 in.	Total
York Redoubt				8									8
Sherbrooke Tower				3									3
Point Pleasant Battery						1							1
Northwest Arm Battery					3								3
Fort Ogilvie													
P.O.W. Tower													
Fort Clarence				2		2							4
Fort Charlotte				30									30
Grand Battery			9										9
Citadel													
Total			9	43	3	3							58

Note: There was a total of 73 pieces dismounted in the defence complex in 1834.

Table 3. Mounted Ordnance (1852)[160]

	Guns						Carronades		Howitzers		Mortars		
	68-pr	8 in.	32-pr	24-pr	18-pr	12-pr	24-pr	12-pr	10 in.	8 in.	13 in.	8 in.	Total
York Redoubt				8									8
Sherbrooke Tower				3									3
Point Pleasant Battery				10		1							11
Northwest Arm Battery				4	3								7
Fort Ogilvie				6									6
P.O.W. Tower				2									2
Fort Clarence				12		2	4						18
Fort Charlotte				25		1							26
Grand Battery			9	2					2				13
Citadel						3							3
Total			9	72	3	7	4		2				97

Note: The totals above denote only the ordnance actually mounted at each site. At several sites there were also a number of carronades and guns that had been dismounted at some earlier time, because they had become unserviceable due to deterioration in the barrels, carriages or platforms. In 1852 these dismounted pieces totalled 43. Of the 97 pieces of ordnance mounted, the CRA and CRE considered only 63 to be in a serviceable state. To illustrate, at Fort Charlotte only 13 of the 25, 24-pounder guns were deemed "serviceable" while at Fort Ogilvie all of the mounted ordnance was "condemned."

understandable opinion of both Lieutenant-Colonel H.J. Savage, CRE, and Lieutenant-Colonel B. Willis, CRA, that the Halifax fortifications required wholesale renovations, particularly with respect to armament.

In March 1852 Savage and Willis forwarded a report to the Board of Ordnance on the condition of each fort and battery in Halifax. The CRE and CRA included a recommendation that 70 of the 77, 24-pounder guns in the defence complex, regardless of whether or not they were serviceable, be replaced by 32-pounder guns.[22] Up until this time the only site in the complex with 32-pounder guns was Grand Battery, although the armament for the new Citadel had been approved and would include 49, 32-pounder guns when the fort was completed.[23] At the other sites in the complex the most common piece of ordnance was the 24-pounder gun.[24] The suggestion that most of them be replaced by 32-pounders was obviously based on a preference for a gun whose shot was heavier and carried farther into the reaches of the harbour.[25] With the Citadel project nearing completion, the CRE and CRA in Halifax hoped that London might begin to turn their attention to those fortifications upon which the defence of the harbour actually depended.

In Great Britain Savage's and Willis' report and accompanying recommendation for new armament received strong support from the Director-General of Artillery who acknowledged that the defence of the harbour was more dependent upon coastal forts and batteries than the Citadel. He did suggest, however, that only one-half of the new armament be 32-pounder guns; for the other half he recommended 8-inch guns (65 cwt).[26] Slightly over a year after that comment was made, a new Director-General of Artillery offered his advice on the rearmament of Halifax. He wanted to see mounted 14, 68-pounder guns (10 at Fort Charlotte and 4 at Fort Clarence) and 56, 32-pounder guns.[27] On 12 October 1853 this proposal was approved by the Board of Ordnance.[28]

Thirteen months after approval was given to rearm the Halifax fortifications, the new heavy smooth-bore ordnance still had not arrived. Lieutenant-Colonel R.J. Stotherd, the CRE in Nova Scotia, notified his superiors in Great Britain that Forts Clarence and Ogilvie had been dismantled in anticipation of its arrival and consequently stood defenceless. Stotherd noted that these alterations had been approved in fall of 1853. He urged that the approved armament "be sent out as early as possible, and if it is practicable that the cast iron pivots and racers be forwarded by some immediate conveyance ... in order that the Engineer Department may be enabled to complete that portion of the Work so as to be in readiness for mounting the Guns immediately after their arrival at this Station."[29] In Great Britain the Board of Ordnance referred the matter to the Director-General of Artillery who replied that the Royal Carriage Department needed to be instructed to provide the requisite pivots and racers for the new guns.[30] In April 1855 Stotherd raised the issue once again. The construction season was beginning, yet there was little he could do without the necessary material from Britain. He was unwilling to dismantle any of the other sites to receive the new armament for fear of leaving the harbour "in a condition almost defenceless... ."[31] Finally, in late April 1855 the first supply of pivots and racers for the new smooth bores were shipped to Halifax.[32] The pieces of ordnance, however, were not immediately forthcoming. In May 1856 they had still not arrived.[33]

The most likely explanation of the delay in sending out the armament to Halifax was the British entry into the Crimean War (1854-56) in March 1854. Presumably, deliveries of ordnance to the Crimean front superceded Halifax's request for new armament. As a result of the delay the Halifax Defence Complex in 1855 and 1856 was the weakest it had been in decades (Table 4). Additional guns had been dismounted after the initial supply of pivots and racers arrived. Consequently, aside from the Citadel, which by 1855 had received its complement of armament,[34] there were only 51 pieces of ordnance mounted in the Halifax area. Key coastal defences such as Point Pleasant Battery and Fort Ogilvie were entirely without armament, while Fort Clarence was barely armed. When Anglo-American relations deteriorated sharply in 1855 following an illegal British attempt to recruit volunteers in the United States for the Crimean War effort[35], the anxieties of the local military authorities about the state of the Halifax fortifications increased greatly. In July 1855 the new General Officer Commanding (GOC) in Nova Scotia, Major-General Sir John Gaspard LeMarchant, recorded his utter dismay following an initial examination of the defences. LeMarchant wrote to his superior in Great Britain that Halifax was in a "wholly unprotected condition." He felt that Fort Charlotte, Fort Ogilvie, Point Pleasant Battery, North West Arm Battery, and Eastern Battery (Fort Clarence) "are more or less in an almost defenceless state from the unserviceable condition of their Guns." Even though the Citadel had most of its ordnance mounted at the time, the GOC reported that it was "unfurnished with its requisite ammunition, and therefore ... may be said to be little more available in a moment of need."[36] The CRE, Lieutenant-Colonel R.J. Stotherd, was more restrained than LeMarchant but he too complained about the non-arrival of the heavy armament and the great many renovations that needed to be carried out. In addition, Stotherd pointed out that the garrison was "inadequate to meet any exigencies that might suddenly arise" if a war did break out with the United States over the Crimean War enlistment controversy.[37] His point was well taken. The strength of the Halifax garrison throughout the controversy was by no means adequate to repel a large American attack if war had erupted. In

Table 4. Mounted Ordnance (1856)[161]

	Guns						Carronades		Howitzers		Mortars		
	68-pr	8 in.	32-pr	24-pr	18-pr	12-pr	24-pr	12-pr	10 in.	8 in.	13 in.	8 in.	Total
York Redoubt				8									8
Sherbrooke Tower				3									3
Point Pleasant Battery													-
Northwest Arm Battery				4	3								7
Fort Ogilvie													-
P.O.W. Tower				2									2
Fort Clarence				2		2	4						8
Fort Charlotte				13			4	4					21
Grand Battery			9	1					2				12
Citadel	5		45	20		1							71
Total	5		54	53	3	3	8	4	2				132

Note: The entire removal of ordnance from Point Pleasant Battery and Fort Ogilvie and the general reduction at other sites in the number of 24-pounder guns had been carried out between 1853 and 1855 in anticipation of replacing the old armament with a supply of 68-pounder guns and 32-pounder guns from Great Britain.

September 1855 there were only two companies (102 men) of Royal Artillery, one company (58 men) of Royal Engineers and six companies (671 men) of the 76th Regiment of Foot.[38] That would not have been enough men to man the Citadel let alone the other defences. An 1856 committee examining the Halifax defences estimated that 1360 men would be needed simply to garrison the Citadel so that it could withstand a six-week siege.[39] In light of the relative unpreparedness of the defence complex the Halifax military authorities must have breathed a sigh of relief when the threat of an Anglo-American war faded in the latter half of 1856.

The new armament (32-pounders and 68-pounders) for the sea defences of Halifax finally arrived in the late 1850s. By 1861 they had all been mounted (Table 5) and most of the batteries were considered to be "in good order."[40] Ironically, just when that wholesale change in the armament of the Halifax Defence Complex was completed demands for even heavier ordnance began to surface. When the 32-pounders and 68-pounders had been approved in 1853 they were among the most common and heaviest pieces in use in the British Empire.[41] Seven years later they were largely outdated. During the intervening period gun designers and manufacturers in Great Britain and in other nations had developed a number of functional models of rifled guns. These new weapons rendered most (but not yet all) smooth bores obsolete. The term "rifle" was derived from a German word rieflen which means "to groove." As it applied to ordnance, the term referred to the grooves that ran the length of the bore of a piece. The projectiles the early guns fired were elongated, cylindrical shells coated with lead alloy sheaths. When the gun was fired and the shell passed up the bore the grooves bit into the sheath and the projectile was imparted with a rotational velocity due to a twist in the grooves. (Sometime later, shells fixed with studs that fitted into the grooves producing the same effect were developed). As a consequence of the spin, the projectiles fired from rifled ordnance had a steadier flight, longer range and greater accuracy than those fired from the smooth bores. There had been experiments with

Table 5. Mounted Ordnance (1861)[162]

	Guns						Carronades		Howitzers		Mortars		
	68-pr	8 in.	32-pr	24-pr	18-pr	12-pr	24-pr	12-pr	10 in.	8 in.	13 in.	8 in.	Total
York Redoubt			8										8
Sherbrooke Tower				3									3
Point Pleasant Battery			10			1							11
Northwest Arm Battery			4		3								7
Fort Ogilvie			6										6
P.O.W. Tower				2									2
Fort Clarence	4		8			2	4						18
Fort Charlotte	10		13			1	4						28
Grand Battery			11						2				13
Citadel		5	45	20		1							71
Total	14	5	105	25	3	5	8		2				167

Note: In addition to the pieces mounted in the Citadel, there were 2, 13-inch mortars and 10, 8-inch mortars stored within the Citadel on skids, ready to be moved into position in the event of an attack.

manufacturing rifled ordnance in the early 1600s but those efforts had been unsuccessful because of the unsophisticated technology of the time.[42] By the middle of the 19th century metallurgy, mechanics and other applied sciences had advanced to the stage where rifled armament became practical. The rifled guns of the late 1850s were known as rifled breech-loaders (RBLs) since they were loaded through the breech rather than down the muzzle as had been the case with the smooth bores. Some of the initial designs for RBLs were less than satisfactory, as the British discovered through their use of Lancaster guns in the Crimea.[43] But over time the models were improved. In January 1859 the Royal Artillery at last accepted a rifled gun designed by William Armstrong for use in the service. The end of the smooth bore era was at hand.

For roughly 300 years, from the middle of the 16th century when it became possible to cast relatively strong and standardized gun barrels to the middle of the 19th when rifled guns were developed, smooth bores had decided the outcome in land and sea campaigns around the world. The impact rifled ordnance would have on existing fortification systems was recognized immediately by the imperial authorities. The Inspector General of Fortifications (IGF), J.F. Burgoyne, outlined the most significant ramifications in an 1859 confidential memorandum:

> The greatly increased power of pieces of ordnance, in length of range, penetration and accuracy of fire, will give much more advantage to the attack of fortresses and fortified posts, than to their defence.
>
> Towers, old castles, and escarp walls in general that are exposed to view, will be readily ruined from greater distance ... parapets to be penetrated and ruined: the interior of the works will be plunged into from great heights, at greater ranges than have hitherto be praticable ....
>
> Guns and ramparts, particularly those of flanks that cannot be opposed by any distant direct fire, will require more than ever to be under bomb-proof cover; parapets must be thickened: openings of embrasures reduced to a minimum ... escarp walls and buildings will have more need of being covered ....[44]

Burgoyne went on to state that since the guns could "throw shot and shells as far as 9000 yards, and with considerable accuracy"; it was a matter of urgency to discover how best to protect the suddenly vulnerable forts and batteries of the Empire. A number of different solutions to the destructive fire of rifled ordnance would emerge in the decades to follow, the best-known being disappearing guns and casemated batteries, but in 1859 those approaches were not readily apparent. "It is extremely difficult, at the present moment, to foresee what species of remedy can be provided against so vast and novel a power."

The advent of rifled ordnance was only one of two revolutionary technological advances encountered by the British military authorities in the late 1850s. The second, the introduction of ironclads, was initially far more serious because the British lagged behind the French in the development of the new warships. In 1859 France launched La Gloire, the first warship to be equipped with protective iron armour plating. Having built one successful model the French pressed their advantage and began to construct other ironclads. In Britain, the general public and professional military people alike expressed concern that the Royal Navy's traditional dominance of the seas was in jeopardy. Compared with the wooden vessels of Great Britain ships like La Gloire seemed invincible. The British navy responded to the situation by quickly laying down ironclads of its own design. The army meanwhile conducted a series of trials to ascertain the vulnerability of armour plate to different types of projectiles. The British government's reaction to the panic over the French lead in ironclad technology was to appoint a Royal Commission composed of senior army and naval officers to investigate the coastal defences of England and Wales. In early 1860 the commission published its report. They recommended a massive, indeed unprecedented, construction program. The commissioners envisioned a chain of forts at strategic points along the British coast, mounting both heavy smooth bores and the new Armstrong rifled guns. The total cost was estimated to be £10,390,000.[45] Parliament ultimately approved the project, albeit after deleting a number of works and reducing the estimated cost by nearly four million pounds.

In spite of the deletions, the imperial government's decision to renovate the coastal defences of Great Britain on such a massive scale was a landmark decision. Heretofore coastal fortifications had been largely overlooked by both the military and Parliament, each of which preferred to expend their efforts and money on the Royal Navy or the other branches of the British Army. Beginning in the 1860s, however, much of the attention of the British military turned to questions relating to the defence of coasts. While the initial preoccupation was with the British coast and the prospect of attack by French ironclads, the British quickly recognized that the fortifications of the key imperial naval bases around the world would also have to be upgraded to cope with the latest technological developments, rifled ordnance and ironclads. When, in the early 1860s, the British began to consider renovating, or as it turned out reconstructing, their farflung imperial fortifications, one of the first places upon which they focussed their attention was Halifax. The outbreak of the Civil War in the United States in 1861 and the ensuing chain of provocative incidents (Trent crisis, southern raids on northern shipping by the British-built Alabama, the Chesapeake episode, St. Alban's raid) often made another Anglo-American war seem probable. The imperial authorities believed that in the event of such a conflict their strategy would once again be based on an offensive use of seapower and that Halifax would play a key role in deciding the outcome. By the 1860s several new factors had been added to the traditional list of Halifax's assets (strategic location, deep-water anchorage, dockyard facilities, loyal militia, proximity to food supplies, healthy climate). Ready access to large supplies of Pictou County coal and good cable communication with the interior of British North America both counted a great deal in the emerging age of steam and rapid communication.

While Halifax possessed many obvious assets it was deficient in one crucial respect. The smooth bore armament mounted in the fortifications, most of which had arrived in Halifax during the late 1850s, was largely outdated by the period of the Civil War. If the

British hoped to retain possession of the valuable harbour they would have to upgrade the defences so that they were capable of withstanding possible attacks by American ironclads mounting rifled ordnance. Imperial officials recognized this fact and accordingly authorized a massive renovation of the Halifax fortifications in the 1860s.

1861-85: Armstrongs and RMLs

In April 1861, four months after the first southern state seceded from the United States and two months after the Confederate States of America established themselves as a separate political entity, the opening shots were fired in what was to become a long and bloody civil war. British reaction to the incipient struggle was mixed. While the British felt a strong antipathy for southern slavery (slavery being abolished in the British Empire in 1833), the economic survival of hundreds of cotton mills in Britain depended upon receiving a steady supply of raw cotton from the plantations of the Confederacy. Consequently, the Union's attempts to blockage all Confederate ports and force the south into economic collapse threatened an important section of the British economy. Although the Union blockade provoked a great deal of resentment in Britain, it was not sufficient to induce the British into formal recognition of the Confederacy. Rather, they decided to remain aloof from the conflict and in mid-May 1861 a formal Proclamation of Neutrality was issued.[46] The proclamation pleased neither the Union nor the Confederacy, each of which had hoped for a stronger, more favorable stand by Britain. Indeed, it was to be the Confederacy's persistence in seeking to gain Great Britain's formal recognition of their independence that led to the first major Anglo-American confrontation of the war.

In mid-October 1861 two emissaries of the Confederacy, John Slidell and James M. Mason, set out on a diplomatic mission to Great Britain. After running the Union blockade, Slidell, Mason and a small entourage travelled to Cuba where they planned to board a British steamer and proceed to Britain under protection of the Union Jack. They believed that the "Yankees" would not dare seize them once they were on board a neutral British vessel for fear of precipitating an international incident. As it turned out, their confidence was misplaced. Not all "Yankees" were so wary of violating international law. Captain Charles Wilkes of the Union patrol boat, the San Jacinto, learned that Slidell and Mason were in Cuba awaiting a British vessel and resolved, entirely on his own initiative, to intercept them once they were on the high seas. On November 7 the two Confederate emissaries boarded the Trent, a British mail steamer, in Havana and set out to sea. Captain Wilkes and the San Jacinto were waiting for them in the Bahama channel, through which the Trent had to pass en route to Britain. On November 8, about mid-day, Wilkes sighted the Trent and when the mail steamer was within range, first a shot and then a shell, were fired across its bow. The Trent quickly shut off its engine and permitted boarding parties from the San Jacinto to come aboard. Mason and Slidell were removed to the

San Jacinto and subsequently taken to Boston where they were imprisoned. The general public in the Union rejoiced over Wilkes' daring action, not only because two renowned Confederates had been intercepted but also because the seizure was a bold affront to British sovereignty. Wiser heads worried how the British would react to the incident.

Reports of the Trent affair reached Halifax before Great Britain. The new GOC in Nova Scotia, Major-General Sir Charles Hastings Doyle, recognized immediately the gravity of the situation. In a private letter to the Lieutenant-Governor of New Brunswick, Doyle wrote that he could not "see how England can without dishonor, permit this outrage to go unpunished and that war must ensue."[47] In anticipation of the British reaction to the incident, and the possibility of war with the Union, Doyle forwarded to the Secretary of State for War an assessment of the defences of the maritime colonies. The GOC felt that both the armament and the works "are totally inadequate, either against an organized attack or a sudden inroad, especially with reference to the improved armament of the present day."[48] The latter remark was a comment on the absence of any rifled ordnance in the region.

When news of the stopping of the Trent reached Britain on November 27 there was an immediate outcry. Demands for retaliation surfaced quickly. At best the British hoped the Union would surrender the Confederate emissaries into British custody and apologize for the rash actions of Captain Wilkes; at worst, there was an expectation that Britain would have to go to war. Thus, while the cabinet drafted a list of British demands to be presented to Washington, preparations were made for war. A ban on the export of saltpetre, arms, ammunition and military stores to the United States was quickly imposed. By the end of the first week of December three battleships, two frigates and one corvette had been ordered to Bermuda and another 15 ships were made ready if needed. On December 6 the first reinforcements set sail for British North America. Three days later it was agreed to send another 10,500 men to the colonies. In all, a total of nearly 15,000 soldiers were ultimately transported to North America during the winter of 1861-62, at a cost of approximately one million pounds. It cost Great Britain almost another million to maintain them in the colonies during 1862-63.[49]

On December 21, the same day as the British demands were officially presented to the American State Department, Sir George Lewis in the War Office wrote to Major-General Doyle in Nova Scotia, that the imperial government attached "great importance" to the "possession of Halifax." It was more than the capital of the colony, it "must be the base of future operations, and the Depôt for all Warlike Stores destined for New Brunswick" and from there on to Canada. As a consequence of the high regard in which Halifax was held a "new armament has been decided upon for its defences."[50] The new armament for Halifax had been authorized on December 12 and was to consist of ten 100-pounder Armstrong rifled guns (81 cwt).[51] (In February 1862 the designation of 100-pounder was altered to 110-pounder as the weight of the heaviest projectile of the Armstrong gun was closer to 110 pounds. These same pieces were still later referred to as 7-inch Armstrong guns.)[52] Doyle was probably already aware of the decision. A week earlier Lieutenant-Colonel Jervois, the Deputy-Director of Works, had written to Lieutenant-Colonel Westmacott, the CRE, informing him that 10 Armstrong guns, their racers, carriages, traversing platforms and stores were ordered for Halifax. Jervois requested the CRE to "carry into effect without delay any repairs or alterations that may be absolutely necessary for putting the works of Defence into an efficient state."[53] On December 21 Jervois notified the CRE approval had been given for the immediate despatch of 38 sets of the recently developed raised racers to Halifax. They were to be installed on the Prince of Wales Tower, in Fort Clarence and Fort Charlotte and wherever the Armstrong guns were to be mounted.[54]

While all the preparations were going on for the reinforcement of British North America and the rearmament of the defences of Halifax, the British demands were being considered by the Union cabinet. At last, on December 26, the decision was taken to surrender the Confederate commissioners. The American statement accompanying the announcement that Slidell and Mason would be turned over was hardly an apology or admission of any serious wrongdoing. Nevertheless, the immediate crisis was over and a war neither side wanted had been averted. In early January 1862 the two confederates boarded a British warship and continued their journey.

The Trent affair, notwithstanding its peaceful conclusion, convinced the imperial authorities in London of the urgent need to be ready for a possible war with the United States. As there was broad agreement that Halifax would be the key British naval base in the event of such a war, it was obvious that steps would have to be taken quickly to renovate the fortifications and provide a heavier calibre armament. In mid-January 1862, barely two weeks after the Trent affair had ended, Lieutenant-Colonel Westmacott (CRE) and Colonel Dunlop (CRA) drew up a joint report on the current state of the Halifax defences and detailed suggestions for ways in which they might be made more effective. To begin with, Westmacott and Dunlop reiterated the conventional wisdom that Halifax was the "keep" of Nova Scotia and New Brunswick, the loss of which would "entirely compromise the security of the whole British possessions in North America."[55] After pointing out that several of the batteries were either in ruins or of extremely limited use as works of defences, they described the ways in which Halifax could be rendered more secure. In addition to renovating the most important of the existing works, they proposed establishing a number of "new positions absolutely necessary to meet the increased range of the armaments now employed."[56]

Two of the new positions Westmacott and Dunlop recommended be fortified were on McNab Island. The first of these was to be constructed at an unidentified location on the south end of the island where the CRE and CRA envisioned "defensible casemated Works" for 30 guns of "powerful calibre." They considered that that end of McNab would make an excellent enemy base and hence attached great importance to its being properly defended. To cooperate with this proposed work they recommended York Redoubt's armament be upgraded. They advocated replacing the eight 32-pounders mounted in the sea battery with ten 68-pounder guns (95 cwt). To protect against an enemy attack from the landward side, they suggested three 18-pounders be mounted on the commanding knoll to the rear of the battery and that two howitzers or similar pieces be placed at Herring Cove. An improved York Redoubt together with the proposed major work for the south end of McNab would have completed the outer line of harbour defences. As for Sherbrooke Tower on Maugher Beach, in the opinion of Westmacott and Dunlop, it was "useless to consider it as a defence."[57]

For the intermediate line of defences the CRA and CRE proposed a number of sweeping changes. The existing batteries, all three of which were located on Point Pleasant, were judged to be too low and exposed as well as inadequately armed. The Prince of Wales Tower, whose role was to support the sea batteries, was currently unarmed. To render this line of fortifications more effective Westmacott and Dunlop recommended three new works be established. Of the three, the one that was to mount the heaviest ordnance was to be constructed on the height of land where Cambridge Battery was ultimately built. The CRE and CRA referred to this proposed work as Upper Level Battery. They advocated mounting 15 guns in an open earth battery; five of the ten 100-pounder Armstrong guns ordered for Halifax during the heat of the Trent affair and ten 68-pounder guns (95 cwt). Approximately half of the guns were to face right and cover the Northwest Arm while the remaining pieces were to face left and fire into the channel between Point Pleasant and McNab Island. To cooperate with the guns on the left face of the proposed Upper Level Battery it was suggested to construct a new work on the northwest tip of McNab, the area known as Ives Point. Westmacott and Dunlop advocated mounting two 68-pounder guns and four 8-inch shell guns in this battery. The third new fortification proposed for the intermediate line of defences was to be a six-gun battery (two 68-pounders and four 10-inch shell guns) located one mile up the Northwest Arm, on the north shore looking out to sea. Hopefully the establishmemnt of a work there, together with the coverage provided by the guns to be mounted in the right face of the proposed Upper Level Battery, would prevent enemy ships from sweeping down the arm and turning the city's defences. The final recommendation for the Point Pleasant area was to surround the Prince of Wales Tower with a defensible redoubt and mount four 32-pounder guns on its terreplein.[58]

Colonel Dunlop's and Lieutenant-Colonel Westmacott's suggestions for improvements of the inner line of defence were far less sweeping than those made for the two outer lines. Commencing in the 1860s there was an obvious shift in the thinking of military strategists which led them to place ever greater stress on the outer harbour positions. As the range of ordnance increased well beyond the distances of the smooth bore era it became more and more important to be able to deny enemy ships access to even the outer reaches of the harbour. With the advent of rifled ordnance the dockyard and town became potentially vulnerable to any ships that had been able to force their way past the outer line. Hence, the need for an improved concentration of fire on the waters between Point Pleasant and York Redoubt, and beyond, was apparent to all. To be sure, a strong inner line of defence was still required as a final protection but with each passing year from the 1860s onward the general trend in the establishment of new works was to construct them farther and farther out to sea. In the joint report of the CRA and CRE they recommended a number of armament changes for the inner line of defences and the creation of one new battery to replace an existing one. At Fort Clarence on the Dartmouth shore they proposed that the 32-pounder guns in the lower battery be replaced by six 8-inch shell guns and that one 8-inch shell gun be mounted on the tower. In addition, they wished to see the fort made defensible against an attack from the landward side. For Fort Charlotte, Westmacott and Dunlop recommended that five of the ten 100-pounder Armstrong guns to be shipped to Halifax be mounted in the battery at the south end of the island, replacing an equal number of 68-pounders. They suggested leaving as they were the other five 68-pounders and the 13, 32-pounders mounted on the island. The final recommendation for the inner line of fortifications concerned Grand Battery. The CRA and CRE thought that it had outlived its usefulness, because of its proximity to Halifax and its concomitant tendency to draw fire on the town. They proposed abandoning it in favour of a new position one mile further out to sea on Point Pleasant. In effect, this was a proposal to reduce the number of fortifications on the inner line and to add one to the intermediate line. They suggested that five of the 32-pounder guns mounted at Grand Battery could be mounted at the new location as well as the five 68-pounders to be replaced at Fort Charlotte by the new 100-pounder Armstrong guns.[59]

Dunlop and Westmacott made no recommendations for the Citadel, although they did note that its guns were all of a lighter calibre than 68-pounder guns,[60] a remark that would seem to imply they felt some heavier pieces should be mounted in the fort. The final suggestion in the joint report was to add six mortars (10-inch or 13-inch) to be used for "general purposes" wherever they might be needed in Halifax.[61]

In February 1862 Major-General Doyle (GOC) was informed that one of the proposals for the Halifax fortifications, a new armament of four 32-pounder guns for the Prince of Wales Tower, had been approved by the Secretary of State of War.[62] A month later the British Parliament voted £10,000 for the fiscal year 1862-63 to be expended on the "improvement of defences in Nova Scotia and New Brunswick." The Deputy-Director of Works, Lieutenant-Colonel Jervois, requested the CRE to submit for approval a number of projects in which the funds could be expended. Jervois, who had already investigated the Halifax defences and would soon do so again, stated that it was "scarcely possible that there should be any difference of opinion" over projects for Fort Charlotte, the proposed Upper Level Battery on Point Pleasant and York Redoubt.[63] Shortly after Jervois' letter, the Deputy IGF informed the CRE that £735 had been added to the 1862-63 estimate. Of the total amount of funds voted only £40 was to be spent in Britain, the rest was to be expended on location.[64] Sometime later that spring the CRE forwarded plans for work on the Halifax fortifications. In a letter dated 26 July 1862, Lieutenant-Colonel Westmacott was notified that the general plans of Fort Ogilvie and High Level Battery (a new designation for Upper Level Battery) were approved. Although detailed estimates were still needed in London the CRE was authorized "to proceed with the formation of the parapets and earthworks, and to prepare, as far as possible, the foundations for the racers in these batteries." Westmacott was advised that the unexpended balance for 1862-63 stood at £6306 and he was not to exceed that amount.[65] Work on the two batteries commenced simultaneously on August 5,[66] presumably as soon as the letter of approval reached Halifax. Throughout the remainder of the 1862 building season all efforts were concentrated on reconstructing Fort Ogilvie and doing the initial work on what was eventually known as Cambridge Battery.

Several months after the close of the construction season Lieutenant-Colonel Westmacott reported to the GOC on the current state of the Halifax defences. While the CRE was pleased that preliminary work had been done on the two "powerful batteries" on Point Pleasant he pointed out the large amount of work remaining to be undertaken if Halifax was to be capable of resisting attack by modern warships. He stated that the "only existing work in any state of efficiency" was the Citadel. The rest of the fortifications were "practically useless against even insult or desultory attack."[67] To remedy the situation he listed, in more or less descending order of priority, the projects remaining to be completed. In a number of cases his recommendations, particularly with respect to armament, differed considerably from those made a year earlier by the CRA and himself.

Of first importance, in Westmacott's opinion, was the completion of High Level Battery (with five 110-pounder Armstrong guns and three 68-pounders) and Ogilvie Battery (with three 110-pounder Armstrong guns and six 68-pounder guns). This represented a significant shift in Westmatcott's thinking about the armament required in these two works. In January 1862, 15 pieces had been proposed for High Level Battery and no mention had been made of installing rifled guns in Ogilvie Battery. The CRE's second recommendation concerned the fortification of the north end of McNab Island, at Ives Point. Situated directly across from the new works on Point Pleasant, the guns of this sea battery would cooperate with the heavy pieces to be mounted in Ogilvie and High Level Batteries in the defence of the outer harbour. Whereas the year before Westmacott and Colonel Dunlop (CRA) had proposed mounting six heavy smooth bores at Ives Point, the CRE now recommended 10 pieces, five 68-pounders and five 10-inch shell guns.[68] The importance placed upon this project, as well as the suggestion to install more armament there, reveals once again the high priority placed by the Halifax military authorities on the need to improve the intermediate line of harbour defences.

Lieutenant-Colonel Westmacott's next three recommendations pertained to the inner line of fortifications. The CRE urged that Fort Charlotte be partially reconstructed and rearmed. He envisioned mounting six 110-pounder Armstrong guns and 17 heavy smooth bores. This proposal represented only a slight modification of the armament recommended a year earlier, the most important change being the suggested addition of a sixth rifled gun. For Fort Clarence four 110-pounder Armstrongs were recommended where none had been identified in January 1862. In addition, the CRE proposed eight heavy smooth bores. With respect to the final work on the inner line, Grand Battery, Westmacott restated the contention he and the CRA had submitted the year before, that it be replaced by a new work farther out to sea, near Steel's Pond on Point Pleasant. Six 68-pounder guns were proposed. Curiously, in the list of armament attached to the report the CRE seems to suggest Grand Battery be rearmed with one rifled Armstrong gun and five 10-inch smooth bores. There had been no mention of this proposal in the rest of the report.[69]

Having made recommendations for the intermediate and inner lines of defence the CRE turned to the outer line. He dropped completely the idea of a major work for the southern tip of McNab Island. In its place he suggested that a "good work" mounting 20 pieces of ordnance (five 110-pounder rifled Armstrong guns and 15 heavy smooth bores) be constructed on Maugher Beach to defend the channel between the beach and the shore below York Redoubt. In addition, he suggested that one or two redoubts could be constructed at strategic locations on McNab to defend against a "ready occupation" of the island. At York Redoubt Lieutenant-Colonel Westmacott envisioned eight 68-pounder guns (10 had been proposed in January 1862) replacing the same number of 32-pounders currently mounted there. He deliberately rejected the idea of mounting rifled Armstrong guns. While the Armstrongs were preferable in most respects to heavy smooth bores, he explained that if they were installed at York Redoubt and the battery was to fall into enemy hands, its long range ordnance might "be turned against the inner defences."[70]

Westmacott's final suggestions concerned a new work for defending the Northwest Arm and the partial rearmament of the Citadel. These proposals ranked eighth and ninth on the CRE's list of projects for the Halifax defences. With respect to the former, Westmacott stated that rather than rebuilding a battery where Chain Rock Battery had been in earlier times, he favoured a "few detached heavy guns placed in position along the Arm, on ground platforms."[71] As for the Citadel, he hoped that some heavier, longer range pieces might be mounted on the "sea front at least." In the list of proposed armament he optimistically suggested a total of 25 new guns for the masonry fort, 10 of which were to be 110-pounder rifled Armstrong guns.[72] With the ten 110-pounders identified for the Citadel, Lieutenant-Colonel Westmacott was recommending that a total of 34 rifled guns, all 110-pounder Armstrongs, be mounted in six different fortifications. Twelve months earlier the 10 Armstrong guns ordered during the *Trent* Affair had been thought sufficient. Technological advances in the construction of rifled guns combined with continuing poor Anglo-American relations throughout 1863 would shortly force a further revision in British thinking about the armament required in Halifax.

Major-General Doyle, the GOC, agreed with nearly all of Lieutenant-Colonel Westmacott's analysis and recommendations. Within a week of receiving the CRE's report he forwarded a report of his own to Great Britain which incorporated most of what Westmacott had written. In submitting a list of proposed armament, however, Doyle did make two minor changes (Table 6). At Grand and Point Pleasant Batteries, the GOC proposed no ordnance.[73] The report on the Halifax defences was quickly approved by the Secretary of State for War and £20,000 inserted in the estimates for 1863-64.[74] The figure was subsequently reduced to £15,000[75] but the important thing was that the rearmament of the Halifax defences was not only to be continued but expanded. The funds to be allocated in Halifax were as follows: York Redoubt (£1000), High Level Battery (£1000), Ogilvie Battery (£1500), Steel's Pond Battery (£1000), Ives Point Battery (£2000), Fort Charlotte (£3000) and Fort Clarence (£2000). In the case of Steel's Pond and Ives Point a large proportion of the money was to be spent on acquiring the necessary land.[76] The local officers met with a great deal of difficulty in trying to buy land on Point Pleasant near Steel's Pond as the owner demanded four times what the British thought it was worth.[77] No

Table 6. Proposed Ordnance (January 1863)[163]

	Armstrong 110-pr	68-pr	10 in.	8 in.	32-pr	Total No.
York Redoubt	-	8	-	-	-	8
Maugher Beach (new work)	5	10	5	-	-	20
McNab (Ives)	-	5	5	-	-	10
Point Pleasant	-	-	-	-	-	0
N.W. Arm (new inner)	-	4	6	-	-	10
Chain Battery	-	4	2	-	-	6
High Level Battery	5	3	-	-	-	8
P.O.W. Tower	-	-	-	-	4	4
Fort Ogilvie	3	6	-	-	-	9
Steel's Pond	-	6	-	-	-	6
Grand Battery	-	-	-	-	-	0
George's Island	6	6	-	1	10	23
Fort Clarence	4	4	4	-	-	12
Citadel	10	10	5	5	45	75
Total	33	66	27	6	59	191

Note: This was the armament proposal submitted by Major-General Sir Charles Hastings Doyle (GOC) on January 22, 1863. It was virtually the same as that proposed by Lieutenant-Colonel Westmacott on 17 January 1863. Within a matter of months Doyle's suggestions were modified yet again. The question of the rearmament of Halifax was in a state of fairly constant change until rifled muzzle loaders (RMLs) were introduced in the mid-1860s.

progress was made on this matter during 1863 and the project was ultimately dropped. In June the first of two pieces of land to be bought by the military on Ives Point, McNab Island, was purchased from the old Quoit Club.[78]

In mid-August the CRA and CRE reported to the GOC on the armament they proposed mounting in the fortifications.[79] Interestingly, the question of ordnance had not yet been settled, although the curbs and ribbed racers were already being laid at Ogilvie and High Level Batteries. At Ogilvie Battery the CRA and CRE suggested mounting four heavy rifled guns (no mention being made of the 110-pounder Armstrongs referred to in previous proposals) and five 68-pounders (95 cwt). The rifled guns were to be situated on the right front commanding the entrance to the harbour while the heavy smooth bores would be on the left front covering the water across to Fort Clarence. Similarly, at the new High Level Battery four heavy rifled guns (once again Armstrong guns were no longer mentioned specifically) were recommended for the central portion of the work designed to command the entrance to the harbour. Each of the two lateral fronts was to mount three 68-pounder guns (95 cwt). It was suggested all nine pieces to be mounted at Ogilvie Battery and all 10 for High Level Battery be mounted on dwarf traversing platforms. Eight 68-pounder guns (95 cwt) on traversing platforms continued to be proposed for York Redoubt, for the same reasons outlined in earlier armament submissions. For the Citadel it was recommended that four 32-pounder guns mounted on the seaward or southeast angle of the fort be replaced by rifled pieces of the "heaviest long range." Finally, the CRE and CRA reported that the ordnance on the seaward front of Fort Charlotte had been dismounted. The intention was to raise that front and relay curbs and ribbed racers for a combination of rifled and smooth-bore armament, "but no instructions have yet been received on the plans submitted." The continuing uncertainty over the nature of the ordnance to be mounted in the Halifax fortifications must have created some problems for the CRE and CRA in the construction of the new works. Moreover, that uncertainty was probably compounded by a sense of frustration since a supply of 110-pounder Armstrong guns was already in Halifax,[80] and five more had been ordered in Britain in March 1863.[81]

In mid-September 1863 Lieutenant-Colonel Jervois, the Deputy-Director of Works, arrived in Halifax and spent a week touring existing defences, works under construction and the sites proposed to be fortified. On nearly every point Jervois concurred with the analysis and measures proposed by the CRE, Lieutenant-Colonel Westmacott.[82] Only on the question of fortifying Maugher Beach did Jervois differ. He recommended that nothing be done at present either on the beach, at McNab Cove or in the provision of a floating battery.

About three months after Jervois' visit to Halifax there occurred yet another incident that strained Anglo-American relations. In early December a party of 16 Confederates commandeered a northern ship, the Chesapeake, off the New England coast and proceeded to Saint John, New Brunswick, to re-coal. The Confederates' aim was to sell the cargo of the captured vessel and turn it into a commerce raider. After slightly more than a week of frantic chase along the south shore of Nova Scotia, the Chesapeake was finally intercepted by an American vessel near Sambro on December 17, within British territorial limits. In the action, two Nova Scotians were captured on board the Chesapeake and a privateer, John Wade, on board a Nova Scotian vessel which was coaling the Chesapeake. The recaptured Chesapeake together with prisoners were then escorted into Halifax harbour to obtain British approval for removing the Chesapeake from British waters. When questioned by Major-General Sir Charles Hastings Doyle, the Administrator of the Province in the absence of the Lieutenant-Governor, the Americans misrepresented the action near Sambro and made no mention of prisoners. The truth was revealed shortly thereafter and Doyle "demanded the surrender of both the prisoners and the Chesapeake." The Americans agreed to turn over the prisoners and the ship into British custody on December 19. It was arranged that John Wade, the southern privateer who had been captured aboard a Nova Scotian vessel, would then be re-arrested by the local authorities and extradition procedures begun. During the planned transfer of the prisoners on Queen's Wharf a number of prominent Haligonians, Alexander Keith, Dr. W.J. Almon and Dr. P.H. Smith interceded to permit Wade to escape by jumping into a waiting rowboat which carried him to safety across the harbour. The American government was enraged by the incident and spoke of cutting off relations with Nova Scotia unless a serious effort was made to rectify the situation. Major-General Doyle feared serious diplomatic repercussions and ordered a large-scale hunt for both Wade and the other privateers who had eluded capture when the Chesapeake was intercepted at Sambro. With respect to the local citizens who had intervened on the wharf and effected Wade's escape there was little Doyle could do. It was a civic matter and the offenders were two well-placed and their actions too popular to secure a conviction. The episode finally ended in March 1864 when the Court of Vice Admiralty ruled that the Chesapeake and its cargo should be restored to its original owners, "a decision that could not have but pleased Northern authorities."[83]

Although the Chesapeake incident of December 1863 did not precipitate the kind of international tension generated by the Trent affair, the episode served to underline the continuing poor state of Anglo-American relations. The need for military preparedness in Halifax against possible hostilities with the Union government had once more been brought to the fore. For 1864-65 another £15,000 was inserted in the estimates for the "improvement" of the defences of Nova Scotia and New Brunswick.[84] Nearly all of that money was expended in Halifax.

In early June 1864, Major-General Doyle, as GOC, was informed by London that the armament of four fortifications in Halifax had at last been decided while a decision on a fifth, York Redoubt, would be made shortly. The two works on Point Pleasant, Fort Ogilvie and High Level Battery were each to mount four 68-pounders (95 cwt), five 7-inch rifled Armstrong guns (formerly known as 100-pounder and then 110-pounder Armstrong guns) and one 12-ton rifled gun. Fort Charlotte was to receive five of the new 12-ton guns when it was reconstructed. The fourth fort for which new armament was listed was the Citadel, upon which it was proposed to mount one 12-ton gun, four 7-inch rifled Armstrongs and five 68-pounder guns (95 cwt).[85] The 12-ton guns referred to were not yet in the service but steps were being taken for their manufacture. When they were finally introduced in 1865 they would be known as 9-inch RMLs (rifled muzzle loaders). Except for these guns, and a small supply of 7-inch Armstrongs ordered a year earlier and expected to arrive soon, the GOC had all the necessary pieces in his command to complete the armament of the four works in question.[85] In addition to York Redoubt, the authorities in Halifax awaited decisions on the armament to be mounted in Fort Clarence where reconstruction had begun the year before, and at Ives Point, where no work had commenced but the construction of a battery had been authorized in January 1864 and a second piece of land purchased for that purpose in March.[86] The initial work on what was to become Ives Point Battery began sometime later in 1864.[87]

The renovation of the Halifax defences continued throughout the summer of 1864, although it does not appear that any of the guns were mounted. An additional supply of armament, five 7-inch Armstrongs and 13, 68-pounders, arrived sometime during that year.[88] By the end of the fiscal year 1864-65 there were over 400 pieces of ordnance in Halifax, 189 pieces were in the charge of the Royal Artillery and 220 in the care of the Superintendent of Stores. Twenty-four pieces were rifled: ten 7-inch Armstrongs in charge of the Artillery and five 7-inch Armstrongs and nine 40-pounder Armstrongs in store.[89]

In the autumn of 1864 Lieutenant-Colonel W.F.D. Jervois, the Deputy-Director of Fortifications, visited North America once again to assess the defences. In his "Report of the Defence of the British Naval Stations in the North Atlantic," dated 25 January 1865, Jervois reiterated the prevailing British belief that in the event of a war with the United States, the Royal Navy "must perform the principal part in bringing a war with that country to a successful issue." He envisioned the Navy blockading the Union seaports, destroying its commerce and carrying out combined naval and military expeditions against strategic points along the Atlantic seaboard. Like so many others before him, Jervois emphasized the Navy's need for good, safe harbours in the North Atlantic where the fleet could rendezvous in security and have repairs carried out to damaged ships. Halifax and Bermuda were unquestionably the most important naval stations in the region. Their very importance to the British, however, made them liable to attack by the Americans if there was a war. Since the fleet might often be absent from either or both of the bases, Jervois continued, it was imperative that Halifax and Bermuda be fortified sufficiently well to be able to repel any possible attack. He noted that although the Americans did not yet possess large numbers of ironclads to threaten these naval stations, "they will turn out a sea-going armored fleet as soon as ... they have made up their minds as to the kinds of ships to build." That possibility made the fortification of both Halifax and Bermuda urgent matters. Their loss would not only restrict the capability of the Royal Navy to wage war, but it would leave Great Britain "without the means of maintaining a fleet for the protection of our commerce and of our interests generally in this portion of the globe." The conclusion was inescapable; the interests of the empire must be served, Halifax and Bermuda must become virtually invincible fortresses.[90] Jervois' recommendations for the Halifax defences contained no significant diversions from what had been proposed by others in preceding years. On the question of armament, Jervois described the number of pieces required at each site, but he did not suggest specific types or calibres. The total cost for the proposed works, including what had already been expended since 1861 (which amounted to £45,000), was placed at £180,000, "or less than half the cost of one of our first-class armour plated frigates." In contrast, the estimate for the renovation of the Bermuda defences was placed at £260,000. Of the figure for Halifax, £70,000 was identified for the inner line, £50,000 for the intermediate line and £60,000 for the outer line.[91] Lieutenant-Colonel Jervois urged that the funds required for the reconstruction of the Halifax defences be allocated in the estimates for the next two or three years. He complained that "at the present rate of progress they will take seven or eight years to execute; whereas, excepting the work on Mauger's Beach (which might be constructed in three years), it would be possible to complete them in two years, if funds were available." Finally, he recommended that a greater supply of 12-ton guns (soon to be known as 9-inch RMLs) be ordered for Halifax as well as a number of iron shields for those batteries where they could be utilized.[92]

It is difficult to assess the impact on the imperial decision-making process of Jervois' "Report on the Defence of British Naval Stations...." In light of the fact that the amount of money submitted in the annual estimates for the renovation of the Halifax defences increased greatly between 1866 and 1869 and that additional heavy rifled guns were ordered for the Nova Scotia capital several months after the report appeared, it is quite possible that it was the Jervois report that prompted the imperial authorities into stepping up the reconstruction of the fortifications. In April 1865, shortly after the start of the new fiscal year, 32 new heavy guns were ordered for Halifax. They consisted of 12, 9-inch (12 ton) guns and 20, 7-inch (7 ton) guns.[93] These new weapons were known as rifled muzzle loaders (RMLs) and represented the latest evolutionary step in ordnance technology. Since the Armstrong RBLs were introduced in the late 1850s there had been complaints about the inability of the vent-piece to seal the breech completely. Sometimes the vent-pieces jammed; at other times they were "blown out violently."[94] A number of approaches were attempted to obviate the difficulties but none was perfectly satisfactory. In 1863, for instance, an artificer from the Royal Gun Factory at Woolwich came out to Halifax to substitute thin iron rings for the copper bouches of the 110-pounder guns in an attempt to improve the performance of the Armstrongs.[95] The development of the RMLs corrected the most serious drawback of the Armstrong guns by doing away with breech-loading entirely. In the new weapons the service charge was "loaded into the gun via the muzzle and rammed down into the chamber; the projectile was then inserted, base first, so that the studs engaged in the grooves, and rammed home so that the studs rode down the grooves until the projectile was in the proper place. On firing, the projectile was propelled up the bore with the studs riding in the grooves and thus imparting spin."[96] Admittedly it took longer to load and fire a RML than it did an Armstrong RBL but it was felt that on every other point the RML was superior. Throughout the late 1860s a number of special committees in Great Britain experimented with the two types of ordnance and each time they concluded that muzzle-loading rifled guns were the better weapons.[97] The RMLs were reported to be capable of firing projectiles nearly 6000 yards (Table 11) but gunners preferred less than 3000 yards and the engineers designed RML forts with a 2000-yard radius in mind.[98]

The 32 RMLs that were ordered for the Halifax defences in April 1865 were not expected to arrive until the following year. In the meantime a number of the heavy guns that had been sent out to Halifax during the early years of the Civil War were mounted in Fort Ogilvie and Cambridge Battery on Point Pleasant.[99] The latter work had by this time shed its earlier designations of Upper Level and High Level Battery. It was named after the Duke of Cambridge, the Commander in Chief of the British Army. The nature of the ordnance which was mounted is unknown but it almost certainly included either 7-inch Armstrongs or 68-pounder guns, or both, as the two batteries had been designed and constructed with them in mind. For some of the guns the period during which they were mounted was quite short. In mid-October at least one of the pieces in Cambridge Battery had to be dismounted "with as little delay as practicable" in order that the platform for one of the new RMLs could be prepared.[100] Shortly after the GOC was notified that Halifax would receive 32 heavy RMLs in 1866, the CRE, Lieutenant-Colonel Westmacott, requested a new crane for the wharf at the Military Store Yard. He explained that the 9-ton crane currently installed there would obviously not be capable of lifting 9-inch RMLs weighing 12 tons.[101] In point of fact, up until this time the heaviest piece of ordnance handled by the engineering staff at Halifax was the 68-pounder smooth bore gun weighing 95 cwt (about 5 1/4 tons). The 7-inch (or 110-pounder) Armstrong gun weighed only 82 cwt. After an exchange of letters on the subject a 15-ton crane was added to the list of services requested for 1866-67.[102]

In the estimate for 1866-67 £35,000 was inserted for the general improvement of the defences, the vast majority of which was to be expended in Halifax.[103] That amount represented more than double the figure provided in the estimates in the three preceding fiscal years. In mid-May 1866 Major-General Doyle was informed that the 12, 9-inch and 20, 7-inch RMLs ordered for Halifax in April 1865 together with their equipment "would be ready for embarkation" in June.[104] That estimate proved to be optimistic as the guns were not ready to be sent out until September.[105] When the guns finally did arrive, probably in late September or early October, they were intended to be mounted as follows: Fort Ogilvie (two 9-inch and eight 7-inch), Cambridge Battery (one 9-inch), Ives Point Battery (three 9-inch and three 7-inch), Fort Clarence (two 9-inch and seven 7-inch), Fort Charlotte (three 9-inch and two 7-inch), and the Citadel (one 9-inch).[106] None of the RMLs in this shipment were slated to be mounted at York Redoubt, although approval had at last been given to mounting rifled ordnance there. The previous fear about York Redoubt falling into enemy control and the rifled guns being turned on the inner defences had apparently given way to a desire to have the strongest possible outer line of defence. Eight 9-inch RMLs were approved for the battery but it would be seven years before they would arrive. In another change, four additional 9-inch guns were approved for the old smooth bore work known as Point Pleasant Battery. That decision was changed sometime later as no RMLs were ever mounted in the battery. Finally, consideration was being given in 1866 to supplying Halifax with another six 9-inch RMLs and a 12-inch gun weighing 23 tons.[107] One 12-inch gun of 23 tons was inserted in the estimates for 1867-68[108], but was never sent out. In fact, only four models of that calibre and weight were ever manufactured, all of which went to the navy.[109]

Apparently during the 1866 construction season Fort Ogilvie and Cambridge Battery were completed (for the time being at least).[110] The other sites that seem to have received attention were Ives Point Battery, Fort Clarence, Fort Charlotte and possibly York Redoubt. The rest of the projects for Halifax, including a new proposal to fortify the height of land where Strawberry Battery was later established during World War II,[111] were postponed so that the works already in progress might be brought to completion. The same approach was followed during the next fiscal year, 1867-68, when another £35,000 was voted for the improvement of the defences.[112] The majority of the funds were probably expended on Fort Charlotte in 1867. In February a contract for £29,000 was signed with Mr. Brookfield, a Halifax building contractor who was responsible for reconstructing many of the Halifax defences during the 1860s, which called for the building of an eight gun casemated battery on the south end of George Island.[113] (The specifications were later altered so that only four casemates were ultimately constructed.[114]) Although most of the money was probably spent on Fort Charlotte, it seems that Fort Clarence and Ives Point also received attention in 1867. In addition, two more pieces of land were purchased on McNab Island with an eye to the eventual establishment of new batteries. They were referred to as South Redoubt (possibly where Fort McNab was constructed later) and S.W. Cliff (possibly another name for the site where Strawberry Battery was built).[115] With the work on the defences progressing well, Doyle was probably pleased to be informed in June 1867 that additional RMLs would be sent out as soon as they were available.[116] Five months later he received further good news. The Duke of Cambridge and the Secretary of State for War had approved the recommendations of the CRA and CRE to replace two 7-inch

Armstrong guns mounted in Cambridge Battery with the heavier and more effective 9-inch RMLs.[117] Similar substitutions, although not always with RMLs of 9-inch calibre, were to be made elsewhere in the defence complex wherever the 7-inch Armstrongs were mounted. By the end of the 1867-68 season the Director of Ordnance was able to report that "the general state of the fortifications is good, and the batteries are armed, with the exception of eight embrasures." The armament of the Halifax defences at that point comprised 190 pieces with another 171 in store. The mounted, or soon to be mounted, ordnance consisted of 12, 9-inch RMLs, 20, 7-inch RMLs, 7, 7-inch Armstrong guns and 151 smooth bore pieces of various types and calibres. There were 23 rifled Armstrongs (7-inch and 40-pounders) and 148 smooth bores in reserve.[118]

In the estimate for 1868-69, £25,000 was approved for the continuing renovation of the fortifications. The major projects for the year appear to have involved four sites: Cambridge Battery, York Redoubt, Fort Clarence and Fort Charlotte. At Cambridge Battery two emplacements (numbers nine and ten) were to be altered so that the 9-inch RMLs replacing the 7-inch RBLs could be mounted. The work at York Redoubt involved the expected completion of the eight-gun battery at the south end of the fort and the commencement of a new magazine and four-gun battery to the north. At Fort Clarence there was the main magazine, earthen parapets and some interior work to be completed. The construction to be done at Fort Charlotte consisted of completing both the four-gun casemated battery and the earthworks of the fort.[119] It was decided that four of the newly developed 10-inch RMLs would be mounted in the casemates when completed.[120] These were the first 10-inch RMLs to be approved for any fortification in Halifax. By November 1873 there would be a total of 15, 10-inch guns mounted in the defence complex[121] as the progression toward heavier ordnance continued.

For 1869-70 another £25,000 was voted for the improvement of the defences in Nova Scotia and New Brunswick. Virtually all of the money seems to have been spent in Halifax. The work for the year concentrated on two fortifications. At York Redoubt it was again hoped that the eight-gun battery to the south, the new magazine and the four-gun battery to the north might be completed. The other projects were at Fort Charlotte where both the earthworks and the four-gun casemated battery were not yet finished.[122] With the work on the key harbour defences nearing completion, the attention of the military authorities turned to the question of providing closer communication among the fortifications. The increasing speed with which attacks could be made by enemy ironclads dictated that a system be established whereby the GOC and his staff could keep in close touch with developments throughout the complex. In 1869-70 a plan for a system of telegraphic communication was approved and in 1870 "an aerial line was made ... between the Citadel and York Redoubt."[123] Thus, the innermost and outermost fortifications were linked. Additional lines were added to the system in the years that followed.

On 5 March 1870, just before the close of the 1869-70 fiscal year, the Defence Committee in Great Britain proposed a fairly drastic alteration in the scheme for arming Halifax. At this time there were 32

RMLs in Halifax (12, 9-inch and 20, 7-inch) and it seems that another 16 were approved (four 10-inch for Fort Charlotte, eight 9-inch for York Redoubt and four 9-inch for the old Point Pleasant Battery). The Defence Committee proposed that the armament comprise 77 RMLs (15, 10-inch, 42, 9-inch and 20, 7-inch).[124] Significantly, they did not recommend increasing the number of 7-inch RMLs but stressed only the need for the heavier calibre guns. The Defence Committee subsequently modified its recommendation when it decided that the four 9-inch guns it had identified for the north end of George Island were not necessary after all. They felt the heavy guns to be mounted on the east front of the Citadel would provide sufficient coverage for that portion of the harbour.[125] With that change the proposal was approved. In January 1871 the GOC was directed "to prepare and put forward a demand" to the Royal Arsenal for 15, 10-inch and 26, 9-inch RMLs, "their carriages, platforms and necessary equipments." Hopefully this shipment would be sent to Halifax during 1871-72, "as supplies become available." Major-General Doyle was cautioned, however, that "the guns are not to be demanded if there is any doubt, as to the positions assigned to them, being ready, within a reasonable time."[126] While the rearmament of Halifax was a top priority, heavy RMLs were needed throughout the empire and the War Office would not countenance guns lying idle in one location when they would be mounted elsewhere. Near the end of April 1871 the CRA submitted a demand for Halifax's second large supply of RMLs.[127]

The 41 RMLs were not shipped to Halifax during 1871-72 as was originally expected. Indeed, Halifax did not receive any additional guns until 1873 when most, and perhaps all, of the 10-inch and 9-inch guns appropriated to the fortifications arrived (Fig. 3). In some respects the delay in the arrival of the RMLs was quite beneficial. There was a great deal of work to be done before the forts and batteries would be ready to mount the new guns. In many cases existing pieces had to be dismounted and emplacements altered. The following description from one of the Halifax newspapers gives some idea of the kind of work that was going on during the 1872 building season:

> Forts Ogilvie and Cambridge, at Point Pleasant, are undergoing a thorough course of reconstruction. The 300 pound or 12 ton guns [9-inch RMLs] hitherto mounted there are to be replaced by 18 ton cannon [10-inch RMLs]. To do this the space now containing three embrasures has to be altered so as to hold only two. This necessitates the tearing down and reconstruction of the entire works. Large detachments of Artillerymen and Infantry are encamped in tents at the Point doing this work.[128]

Presumably similar work was going on more or less simultaneously at Ives Point Battery, York Redoubt, Fort Charlotte and Fort Clarence. At last, in January 1873, Doyle was given a detailed listing of the armament shortly to be sent to Halifax and the mountings upon which they were to be placed (Table 7). Of the 77 RMLs planned to be appropriated to Halifax, 24 were expected to be mounted in casemates (four at Fort Charlotte, 11 at Fort Clarence, nine at Ives Point) and the remainder in open batteries on dwarf traversing platforms.[129] By May, some of the new guns, and perhaps all of them, had arrived. The difficulties

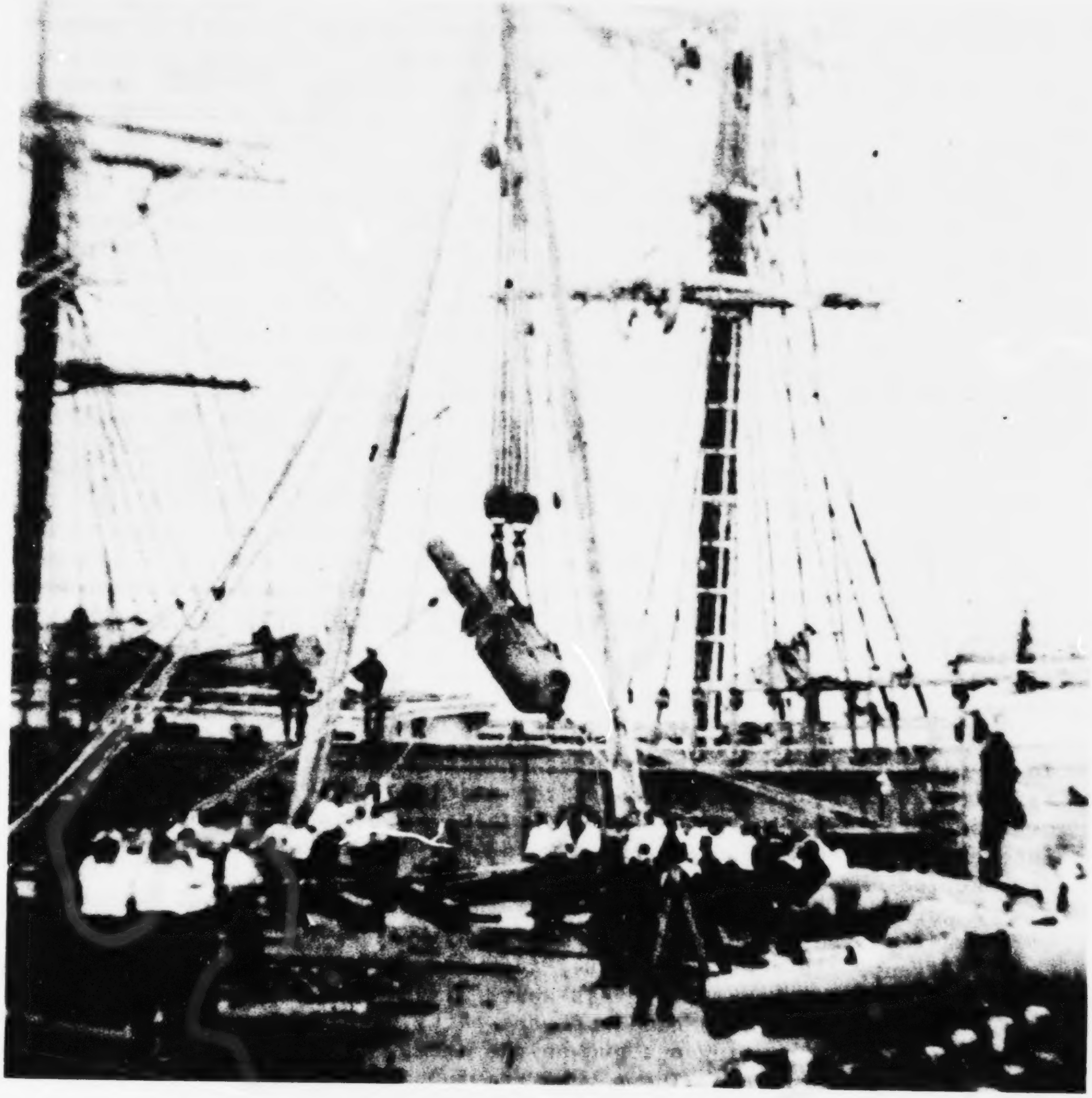


Figure 3. Unloading RMLs at Halifax. There were two major shipments of RMLs to Halifax. The first appears to have arrived in the fall of 1866 and consisted entirely of 9-inch and 7-inch guns. Quite possibly all 32 RMLs (12, 9-in. and 20, 7-in.) ordered for Halifax arrived at the same time. The second shipment arrived from Britain in 1873 and contained 10-inch and 9-inch pieces. Once again it is possible that all 15, 10-inch and 20, 9-inch RMLs appropriated to Halifax came out at the same time. This illustration is a detail from a photograph which shows at least 15 heavy RMLs being unloaded. From the size of the barrels it is probable that this is a photo of the 1873 shipment. (*Public Archives of Nova Scotia.*)

Table 7. Proposed Ordnance (January 1873)[164]

	RMLs							RBLs			Converted		Smooth Bores			
	10-in.			9-in.		7-in.					80-pr to	32-pr to				
	CA	DA	DC	CA	DA	DA	DD	7-in.	40-pr	20-pr	7-in.	64-pr	32-pr	24-pr	Mortars	Total
Citadel & Saluting						7		9		12		20	11	20	11	90
Grand Battery#																0
Fort Charlotte°	4				12											16
Fort Clarence				11								4		4		19
Ives Point Battery	3			6												9
York Redoubt			3		8											11
Cambridge Battery		5				3										8
N.W. Arm Battery											4					4
P.O.W. Tower												8				8
Fort Ogilvie					5	4	1									10
Not appropriated to works +						5		13	17						6	41
Total	7	5	3	17	25	19	1	22	17	12	4 **	32 **	11	24	17	216
To be retained				12		20		22	17		4	32	11	24	17	159
To be supplied		15		30						12						57

* An extra 9-inch gun now at Citadel to remain for drill purposes (not mounted nor to be mounted).
# To be dimantled.
° Four 9-inch postponed.
+ Including armament for advanced land positions.
** To be converted.
The first letter in the abbreviations listed under the RMLs indicated whether the mounting was to be on a casemate (C) traversing platform or a dwarf (D) traversing platform. The second letter indicated the type of pivot arrangement to be used. Thus, the 7-inch guns (DA) proposed to be mounted at the Citadel were to be upon dwarf traversing platforms with "A" pivots.

involved in transporting the pieces, particularly the 10-inch RMLs weighing 18 tons, to the various sites and then mounting them were considerable. The Acadian Recorder provided its readers with an interesting account of the kind of work with which the military was preoccupied throughout the spring and summer of 1873:

> A working party of fifty artillerymen are engaged in mounting the new battery at Fort Cambridge, Point Pleasant. It consists of five 18-ton guns. They have been landed at the Government wharf at the North West Arm and after three days hard work the party have [sic] succeeded in getting one gun up the steep, and mounting it in its position. These guns are furnished with Colonel Moncrieffe's patent gun-carriages and oil-buffers by which the gun is forced again into position from the recoil after firing. They throw a 600 pound shot.[130]

At the end of the construction season the CRA reported that there were 72 pieces of ordnance mounted in the Halifax defences, not including the pieces at the Citadel (Table 8). For three of the sites (York Redoubt, Fort Charlotte and Cambridge Battery), their armament was as it would remain for more than a decade (Figs. 4, 5, 7). The other three RML fortifications still required pieces to be mounted. At Fort Ogilvie it was simply a question of mounting one more 9-inch gun in the remaining emplacement. This was probably done in 1874 and certainly completed by 1877 (Fig. 8). Three 10-inch guns remained to be mounted on the left face of Ives Point Battery. They appear to have been mounted by 1877 (Fig. 9). At Fort Clarence there was considerably more work remaining.

The eight 7-inch guns currently mounted had to be replaced by an equal number of 9-inch pieces and one additional 9-inch RML mounted in the empty 11th casemate.[131] This work was apparently carried out between 1874 and 1876 (Fig. 10), although two of the 9-inch guns had been dismounted by 1877.

The mounting in 1873 of most of the RMLs appropriated to the six key harbour defences meant that the military authorities in Halifax could at last turn their attention to the rearmament of the Citadel. Although the evidence on the subject is scant, it seems reasonable to suggest that commencing in 1874 and continuing at least until 1879, the work involved in constructing RML emplacements in the fort was carried out (see Citadel-Rifled Ordnance). By July 1878 only two of the 57 pieces intended to be mounted in the Citadel had actually been mounted.[132] During the 1879 construction season a determined effort was made to complete additional emplacements but in the end only 14 were finished and only 11 RMLs were mounted.[133] With the rearmament of the Citadel and the mounting of the remaining pieces at Fort Ogilvie, Ives Point Battery and Fort Clarence, the Halifax defences were in principle capable of withstanding almost any conceivable contemporary sea attack. The shape of the harbour was almost perfectly suited for RMLs. No portion of any key channel was more than 3000 yards wide and the distances were often closer to 2000 yards. By fortifying both sides of the key channels, devastating overlapping fields of fire were created which rendered almost impossible the likelihood of a successful attack on the defences (Fig. 13). Any enemy vessels capable of forcing their way past the RMLs mounted at York Redoubt would have found it extremely rough going trying to sweep into the inner harbour. There was a total of 27 RMLs mounted in the three works (Ives Point Battery, Cambridge Battery and Fort Ogilvie) protecting the waters between the entrance to the harbour at Maugher Beach and the channel between Point Pleasant and McNab Island. Beyond that line of defence lay Forts Clarence and Charlotte mounting between them another 23 RMLs, most of which faced seaward. The final RML fortification facing the harbour was the Citadel, which mounted 11 RMLs, whose principal task in this era was to command the waters to the north of George Island and deny an enemy access to the hills above Dartmouth, approximately 3000 yards

Table 8. Mounted Ordnance (November 1873)[165]

	RMLs				Smooth Bores		
	10-in.	9-in.	7-in.	68-pr gun	32-pr gun	24-pr carronade	Total
York Redoubt	3	8					11
Ives Point		6					6
Fort Clarence		2	8				10
Fort Charlotte	4	8		8			20
Fort Ogilvie		4	5				9
Cambridge Battery	5		3				8
P.O.W. Tower					4	4	8
Total	12	28	16	8	4	4	72

Note: For some reason the report submitted by the CRA did not list the pieces mounted in or on skids in the Citadel. The ordnance mounted at York Redoubt, Fort Charlotte and Cambridge Battery would remain unchanged for more than a decade. The armament for Ives Point, Fort Clarence and Fort Ogilvie was still not complete at this time.

away.[134] The only work whose guns faced exclusively on the Northwest Arm were the 64-pounder converted RMLs on the Prince of Wales Tower. Throughout much of the 1870s the plan was to reconstruct the old Northwest Arm Battery and mount four 80-pounder RMLs (converted from 68-pounder smooth bores) to cover the entrance to the arm. By 1884 that project was no longer thought necessary. It was felt the pieces mounted on the right face of Cambridge Battery adequately commanded that water.[135]

The imposing array of RMLs mounted in Halifax during the 1870s and 1880s had been put in place at considerable cost to the imperial government. It has been estimated that between 1863 and 1873 £265,000 was expended in the reconstruction of the fortifications: £185,000 on the construction of the works, £60,000 for the new guns and £20,000 for the iron shields used at several of the batteries. To put that figure in perspective, the cost of ships such as the Bellerophon and the Northampton was placed at £356,000 and £414,000, respectively.[136] In comparison, and in light of the stress the British laid on having secure and strategically placed imperial naval bases around the world, the cost of renovating the Halifax fortifications appears to have been judged a sound investment by most if not all contemporary strategists. The irony was that after so much money and effort had been expended to render the defences virtually invincible, there was not enough trained manpower in Halifax to work the new guns. Commencing around 1870, shortly after the first RMLs were mounted in the defences, a third company of Royal Artillery was stationed in Halifax,[137] providing the fortifications with enough trained artillerymen to man only about one-third of the rifled pieces. It was a situation apparently common throughout the Empire, both in Britain and abroad.[138] While in Halifax there had never been enough artillerymen to service all the guns, in the smooth bore era the problem was much less serious because the local militia were relatively familiar with the traditional gun crew routine and could always be counted upon in the event of an attack. The heavy RMLs were considerably more complicated than the smooth bores. It took a well-drilled 11-man crew 2 1/2 minutes to load, train and fire a 9-inch or 10-inch gun while a trained smooth bore crew could get off a round a minute. In warfare speed is always of the utmost importance and it was becoming increasingly so in the latter half of the 19th century as warships were getting bigger and faster with each passing year.

Poorly trained, or even worse, untrained gun crews operating the heavy RMLs at Halifax could have meant the difference between victory and defeat in the event of an attack. The remedy to the situation was as obvious as it was difficult, to simply give the militia the training they needed to operate the heavy guns. Unfortunately for the British, peacetime training of the militia by imperial troops was deemed unacceptable by the government of the recently confederated Canada. Incipient Canadian nationalism on the one hand,[139] and an unwillingness by the federal government to contribute more than a pittance to defence matters on the other hand,[140] combined to doom all attempts by GOCs during the 1860s and 1870s to introduce the Nova Scotian militia to the new warfare. In spite of the fact that at the time of the withdrawal of imperial troops from central Canada in 1870-71 the Canadian government sought and received a commitment from the

British government to defend Canada in the event of any future war, there was no attempt to permit the British to prepare the Canadian militia for the roles they might have to perform in wartime. As a result of the shortage of trained artillerymen in the late 1880s, a selection was made of which RMLs to man in the event of an attack. For obvious reasons the guns selected were those covering the outer reaches of the harbour. It was planned to man nine of 11 pieces at York Redoubt, six of nine at Ives Point Battery, three of Cambridge Battery's six guns, two of eight at Fort Ogilvie and two of 10 at Fort Clarence. None of the pieces at the Fort Charlotte or the Citadel were to be manned.[141] This selection was not fixed of course, as in the event of enemy vessels successfully forcing the outer line, artillerymen would be reassigned to inner fortifications.

In January 1879, only a few years after most of the RMLs were finally mounted in the Halifax Defences, an accident occurred on board the HMS Thunderer which more or less signalled the beginning of the end of the RML era. While engaging in firing practice one of the two 12-inch guns on the Thunderer exploded killing most of the men in the turret. Later experiments concluded that the gun had burst after being inadvertently double-loaded. Advocates of a return to breech-loaders claimed that such an accident could only have occurred with a muzzle-loading weapon. Gradually during the 1870s support for breech-loaders had been rekindled as the drawbacks of the RMLs (primarily the slowness and awkwardness of loading by the muzzle) became apparent. Moreover, most of the difficulties associated with the RBLs produced in the early 1860s were being overcome with the improved technology of the late 1870s. In 1878 the Director of Artillery instructed the Royal Gun Factory at Woolwich to design a breech-loading gun with an interrupted-thread, screw-breech system. The accident aboard the Thunderer gave added momentum to the move back to breech-loading guns. The new type of breech-loaders were referred to as BLs to distinguish them from their RBL predecessors. In 1879 a 10-inch BL was ordered for coast defence and a Committee on Ordnance was appointed to consider once again which was superior, muzzle-loading or breech-loading. In July the Committee reported in favour of BLs. The comparative ease of loading through the breech, now that the problems associated with the vents were largely solved, helped decide the issue. In addition, the initial version of the 10-inch BL could fire shells up to 10,000 yards while retaining considerable penetrating power. Although they cost four times as much as 10-inch RMLs, fewer guns were needed to cover the same extent of water so there was a corresponding saving in manpower.[142] With the change in the climate of opinion, Sir William Armstrong submitted designs for improved models of rifled breech-loaders, 8-inch and 6-inch guns. The 8-inch was judged a failure but the 6-inch piece was a success and "a number were purchased for use by the Royal Navy." The Royal Gun Factory was then given the task of producing a similar but more powerful model, and this was the birth of what was to become on of the standard coast artillery guns of the 1880s and 1890s.[143] Throughout the early 1880s thorough tests were carried on in Great Britain with a variety of new BL models. In 1884, breech-loading guns were mounted aboard ships in the Royal Navy. The day was rapidly approaching when they would be appropriated to key

Table 9. Mounted Ordnance (July 1878)[166]

	RMLs				Smooth Bores
	10-in.	9-in.	7-in.	64-pr	32-pr
York Redoubt	3	8			
Ives Point	3	6			
Fort Clarence		9			4
Fort Charlotte	4	8			
Fort Ogilvie		5	5		
Cambridge Battery	5		3		
P.O.W. Tower				5	
Citadel	(Excluding the pieces in the saluting battery only two guns, of undetermined nature, were listed as being mounted in the fort.)				

Note: There were 11, 9-inch RMLs appropriated to Fort Clarence, but the ones in Nos. 1 and 2 emplacements were reported as being dismounted about two years earlier. No reason was given. Four 64-pounders were apparently in the fort and two were supposed to be mounted on Moncrieff counterweight carriages the following year. Three additional 64-pounders, were appropriated to the Prince of Wales Tower but were being stored at Cambridge Battery. A four-gun battery had been approved for the Northwest Arm but was not constructed. It was supposed to mount four 80-pounder RMLs if built, which it never was.

coastal defences around the Empire. The Royal Commission on the Defence of British Possessions and Commerce Abroad (1882) identified Halifax and Bermuda to be of "first importance to Her Majesty's navy as coaling stations and to merchant vessels as harbours of refuge. Without ports in which to coal, "Her Majesty's ships could neither protect British trade in the western waters of the Atlantic, nor act against the trade of the United States."[144] Because of the continuing importance attached by British strategists to the maintenance of Halifax as a first-rate imperial naval station, early consideration was given to revising the armament of Halifax in light of the latest technological advances.

Figure 4. York Redoubt (1878). Throughout the first half of the 19th century there were 8, 24-pounder smooth-bore guns mounted in the battery at York Redoubt. In the mid-1850s approval was received to replace them with 32-pounder guns. In the early 1860s, shortly after that substitution was completed, recommendations were made to mount 68-pounder guns there, one of the heaviest types of smooth-bore ordnance. Apparently 68-pounders were never mounted. By 1866 approval had been given to the idea of mounting rifled ordnance, in an 8-gun battery to the south and a 4-gun battery to the north. That proposal was later altered and the 11-gun battery shown in the illustration was constructed. By November 1873 the approved ordnance, 3, 10-inch RMLs and 8, 9-inch RMLs were all mounted. (*Public Archives of Nova Scotia*.)

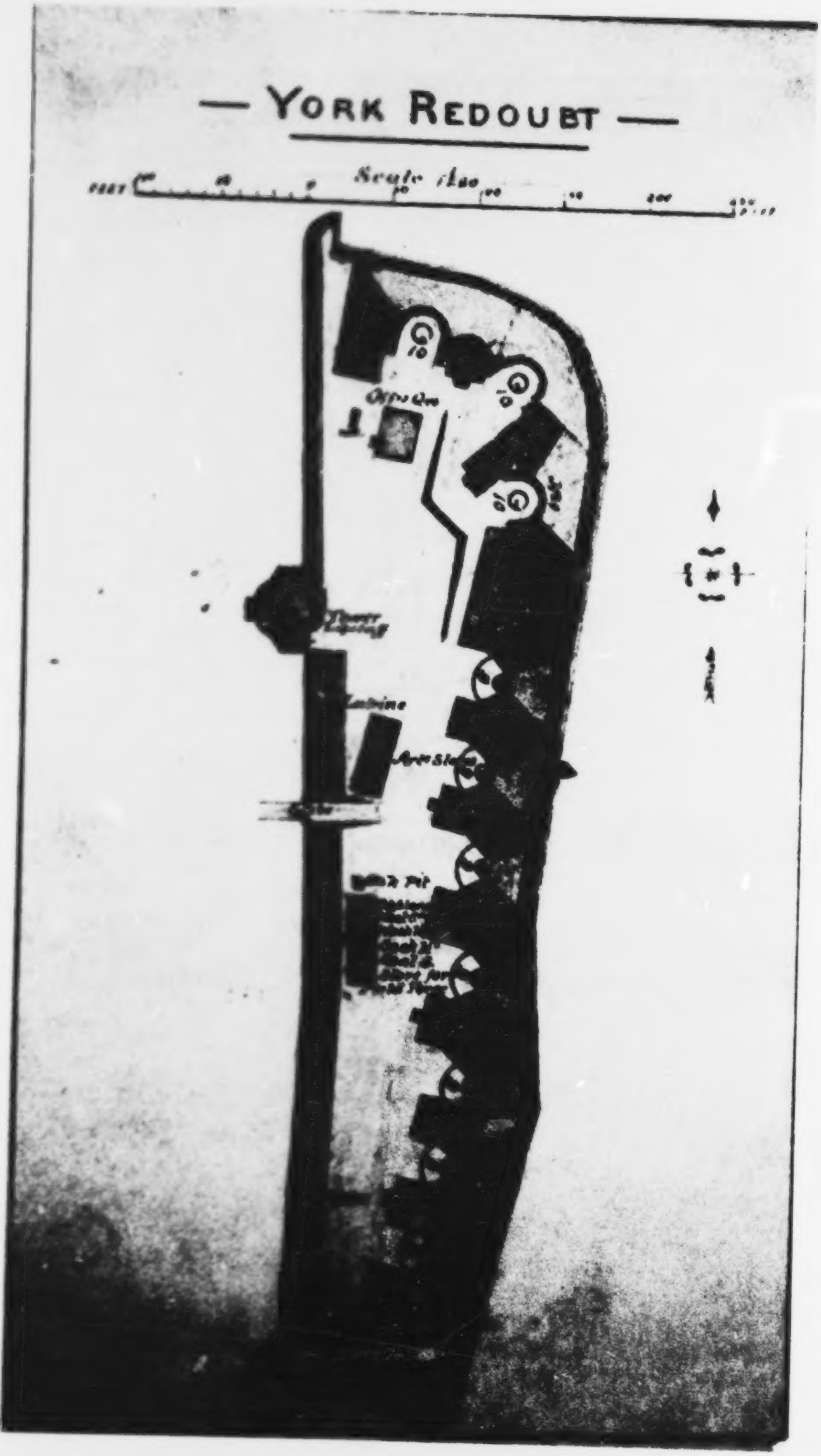
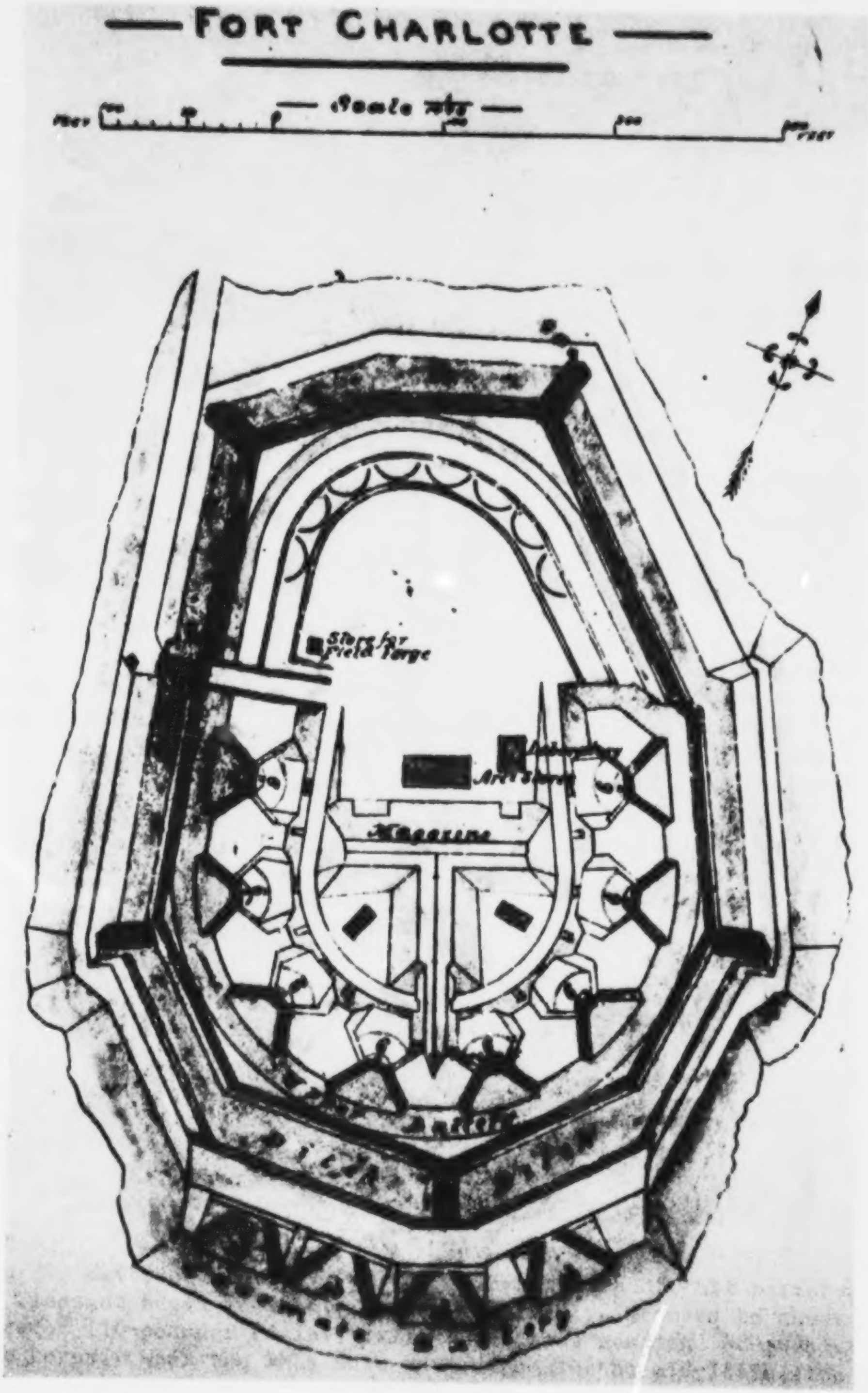

— YORK REDOUBT —
Scale
G 10
G 10
G 10
Offrs Qrs
Tower
Latrine

Figure 5. Fort Charlotte (1877). With the outbreak of the Civil War in the United States and the concomitant fear of an Anglo-American war, the rearmament of Fort Charlotte became a top priority. Initially it was planned to install 5 rifled Armstrong guns at the south end of the island, but when rifled muzzle loaders were developed in the mid-1860s, a decision was made to appropriate 3, 9-inch and 2, 7-inch RMLs to the island. By the late 1860s military thinking had changed again and it was decided to establish a 4-gun casemated battery (with 10-in. RMLs) and an 8-gun upper battery (with 9-in. RMLs). These guns were all mounted by 1873 and their arrangement is shown on the accompanying plan. Mounting rifled ordnance (both 9-in. RMLs and 64-pounder RMLs were mentioned) at the north end of the island where an earlier smooth-bore battery had been located was considered several times. This idea was ultimately dropped because it was felt that the rifled guns at the Citadel adequately commanded the northern portion of the inner harbour. (*Public Archives of Nova Scotia*.)


FORT CHARLOTTE
Scale
Store for Field Forge
Magazine
Casemate Battery

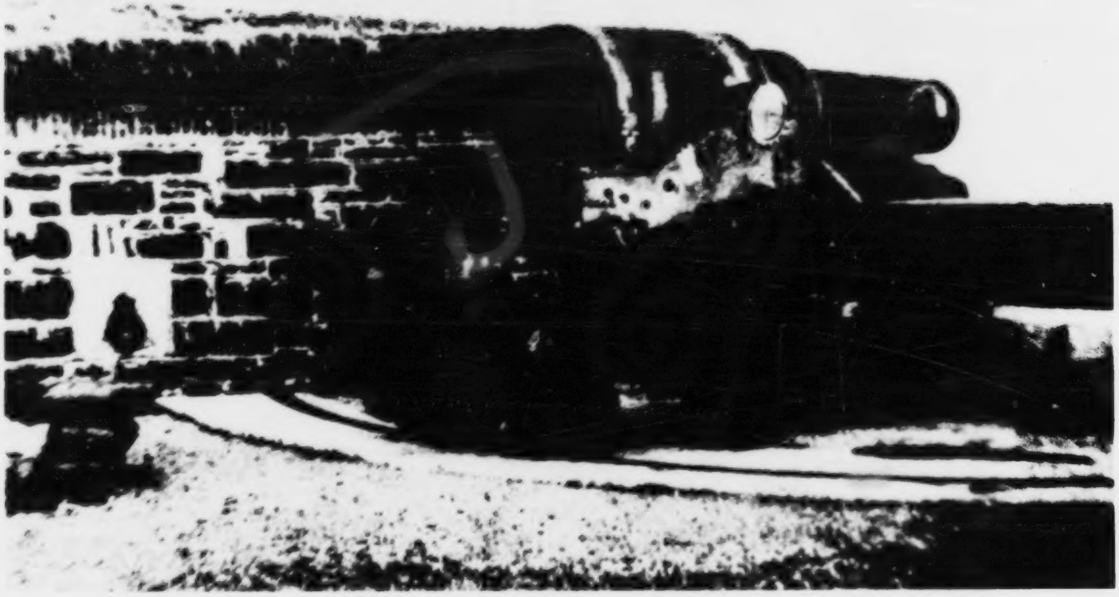


Figure 6. Fort Charlotte - 9-inch RML (ca. 1877). From 1873 until the late 1890s there were 8, 9-inch RMLs mounted in the upper battery of Fort Charlotte. This photo gives an excellent close-up view of either the No. 3 or No. 4 gun. A supply of 9-inch shells is visible to the left of the gun. In the late 1890s the entire upper battery was dismantled and reconstructed for 3, 4.7-inch QF guns. (*Public Archives of Nova Scotia.*)

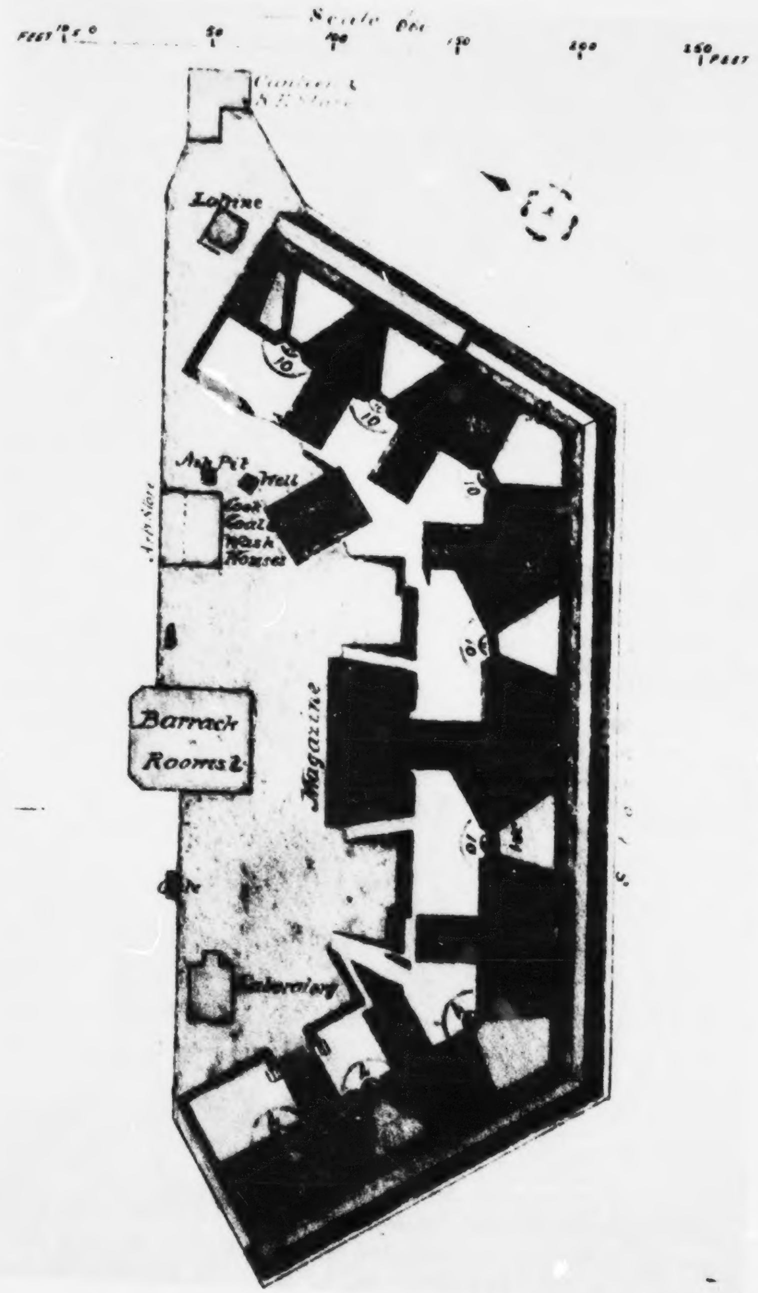

Scale
FEET 0
50
100
150
200
250 FEET
Lodging
Ash Pit
Well
Cook
Coal
Wash
Houses
Barrack
Rooms 2
Magazine
Laboratory
10
10
10
10
10

Figure 7. Cambridge Battery (1877). Construction of this battery on Point Pleasant began in 1862. It was originally intended to mount a mixture of 110-pounder (7-in.) rifled Armstrong guns and 68-pounder smooth bores. When the RMLs were introduced in the mid-1860s, the battery was reconstructed so that the heavier, more effective pieces could be substituted. By November 1873 the 8 guns shown on the plan were all installed. Cambridge Battery mounted more 10-inch RMLs than any other fortification in Halifax. (*Public Archives of Nova Scotia.*)

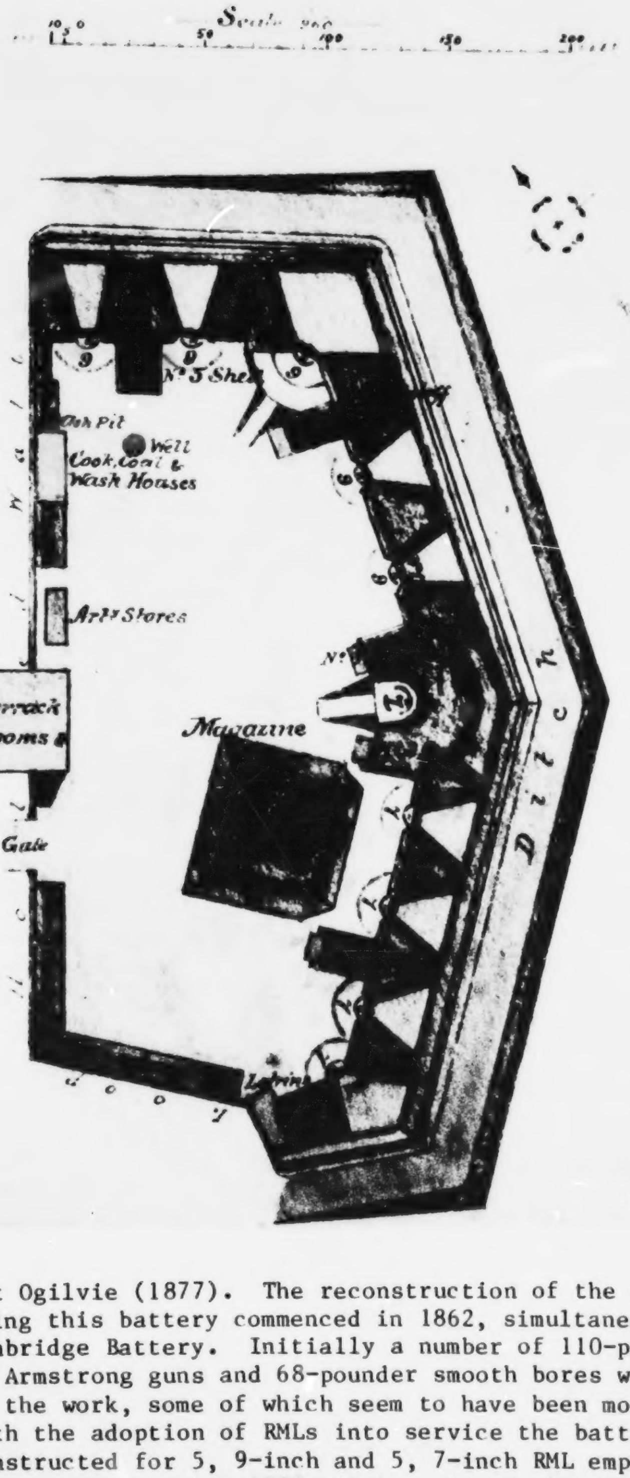

Scale
50
100
150
200
Nº 3 Shell
Ash Pit
Well
Cook, Coal & Wash Houses
Artʸ Stores
Barrack Rooms
Magazine
Gate
Latrine
9
9
9
9
9
7
7
7
7
Ditch

Figure 8. Fort Ogilvie (1877). The reconstruction of the smooth-bore battery preceding this battery commenced in 1862, simultaneously with the work on Cambridge Battery. Initially a number of 110-pounder (7-in.) rifled Armstrong guns and 68-pounder smooth bores were identified for the work, some of which seem to have been mounted by the mid-1860s. With the adoption of RMLs into service the battery had to be partially reconstructed for 5, 9-inch and 5, 7-inch RML emplacements, as shown on the plan. By November 1873 all but one of the pieces was mounted, the remaining 9-inch gun probably being put in place in 1874. (*Public Archives of Nova Scotia.*)

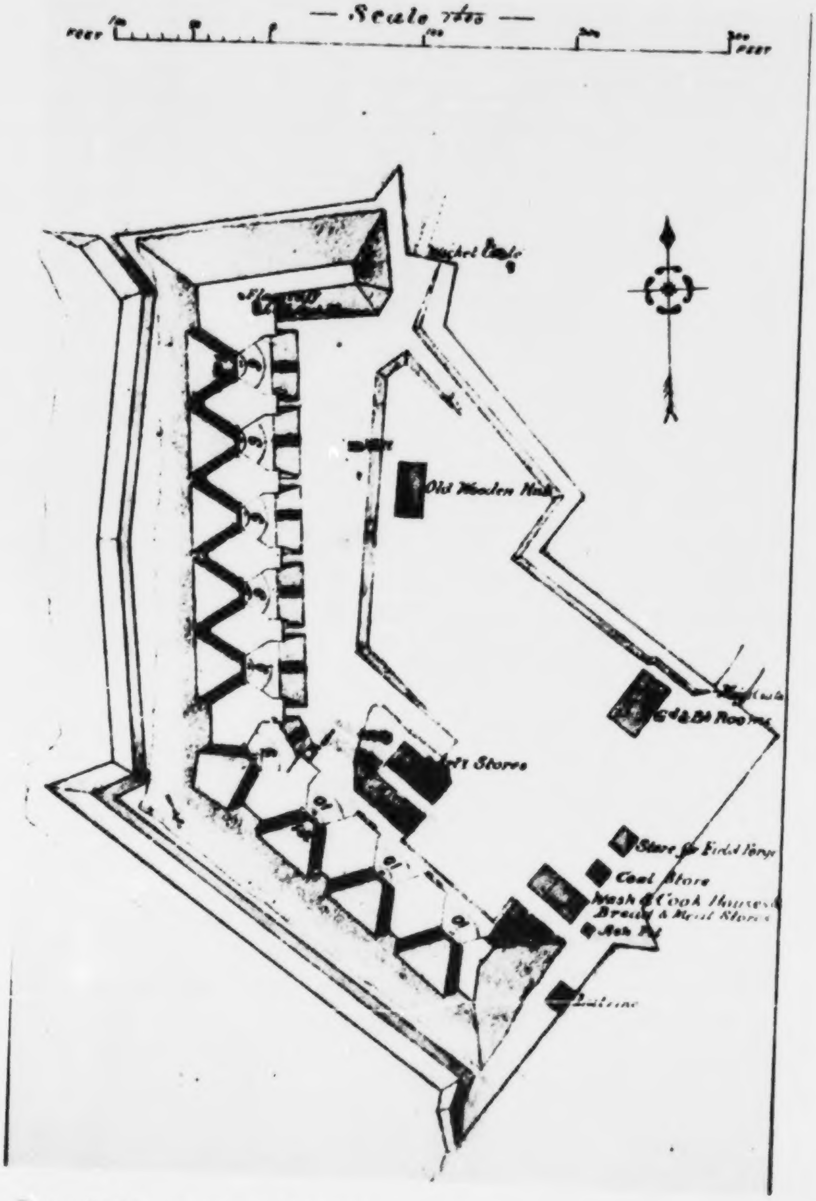

Scale
Feet
Feet
Old Wooden Hut
Stores
Gd & Bk Rooms
Store for Field Forge
Coal Store
Wash & Cook Houses & Bread & Meat Stores
Ash Pit

Figure 9. Ives Point Battery (1877). This battery located at the northwestern tip of McNab Island was one of two new fortifications established during the 1860s, the other being Cambridge Battery. Property was acquired on Ives Point in 1863 and 1864 and by late 1864 work on the battery had begun. Heavy smooth bores were initially recommended, but as with all the other fortifications in Halifax rifled guns were subsequently substituted. In 1866 a portion of the first shipment of RMLs to Halifax was appropriated to the battery, which was still under construction. By January 1873 the ordnance to be mounted had finally been decided, 3, 10-inch and 6, 9-inch RMLs. All of the 9-inch pieces were in place by November 1873 and the 3, 10-inch were probably mounted the following year. In the summer of 1877, 2 of the 10-inch RMLs were still mounted and the remaining 7 guns were lying on the ground behind the battery. (*Public Archives of Nova Scotia.*)

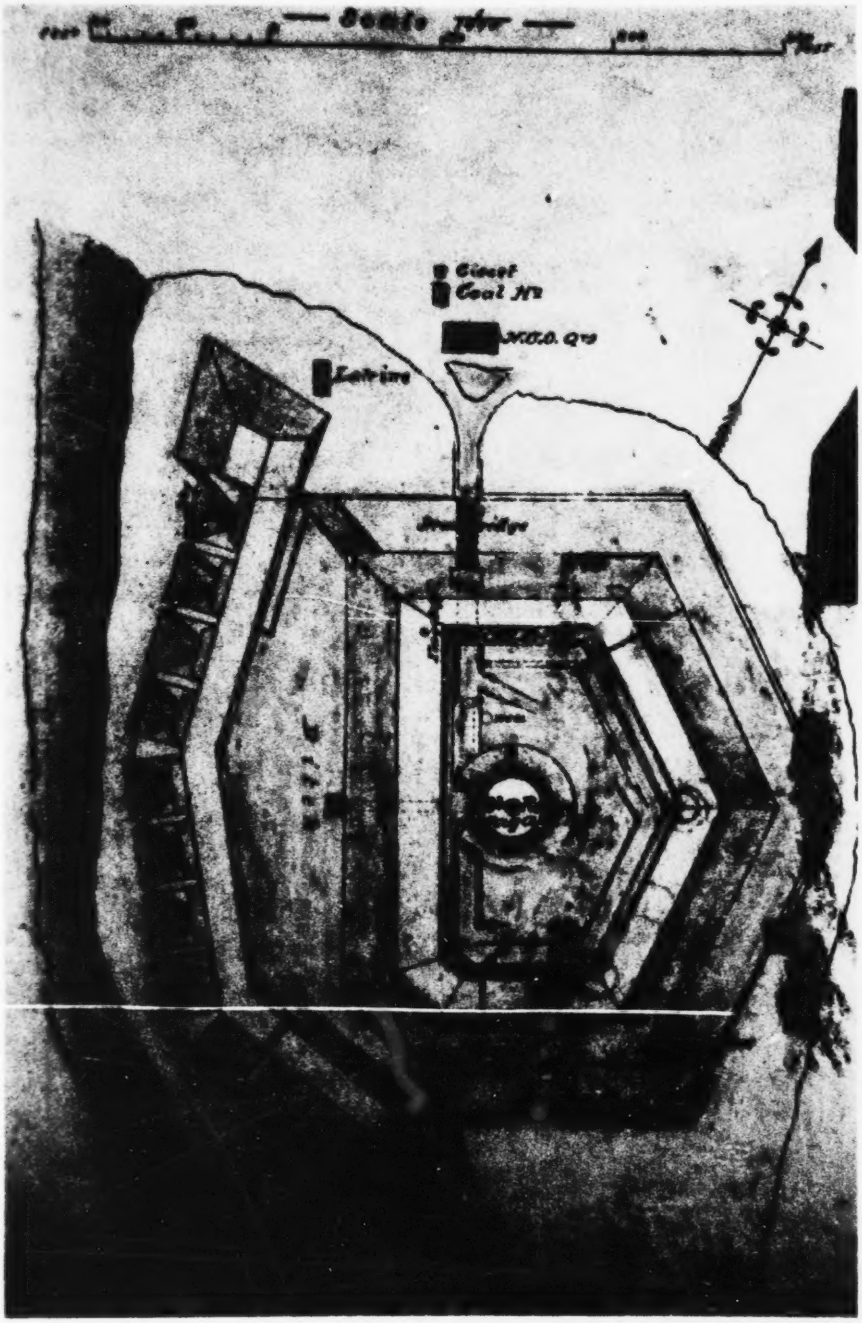


Figure 10. Fort Clarence (ca. 1877). The reconstruction of Fort Clarence for a mixture of rifled Armstrong guns and heavy smooth-bore armament was authorized in March 1863. The ordnance appropriation changed in the mid-1860s when RMLs were introduced and it was decided to construct an 11-gun casemated battery on the seaward face of the fort. In November 1873 there were 2, 9-inch and 8, 7-inch RMLs mounted in 10 of the 11 casemates. Apparently by 1876 the 7-inch guns had been replaced by 9-inch pieces and each of the casemates mounted a 9-inch gun as is shown in the representation. (*Public Archives of Nova Scotia.*)

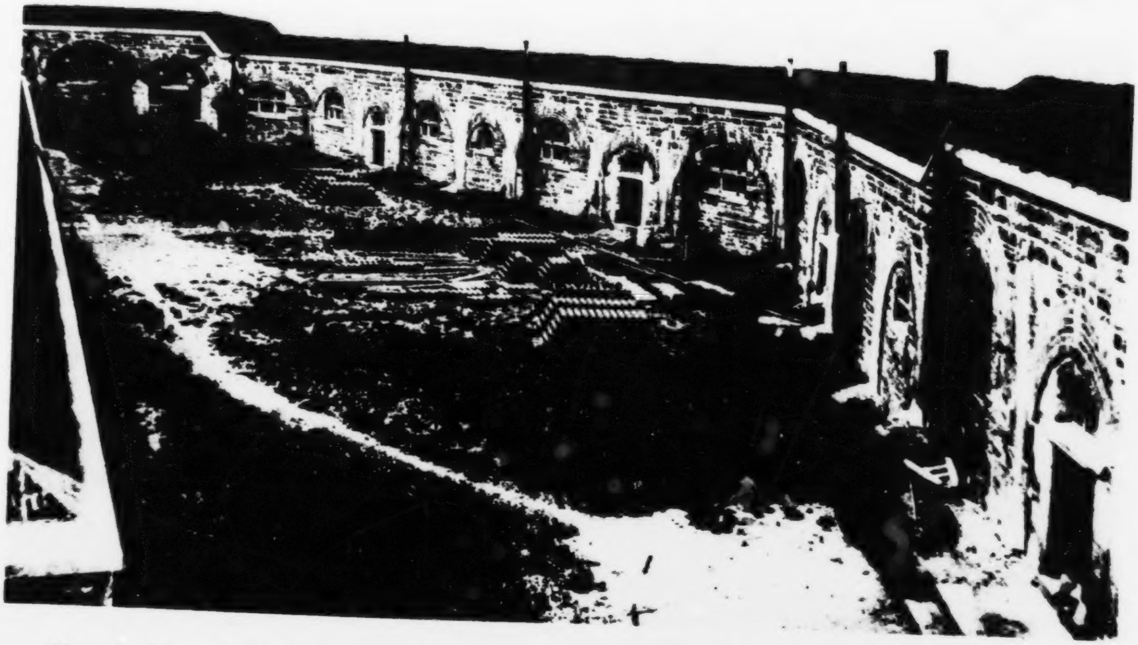


Figure 11. Fort Clarence (ca. 1878). This is a photo of the interior of Fort Clarence, showing the rear walls of the 11-gun casemated battery on the seaward face of the fort. Note the shells for 9-inch RMLs placed in piles in the centre of the photograph. (*Public Archives of Nova Scotia.*)

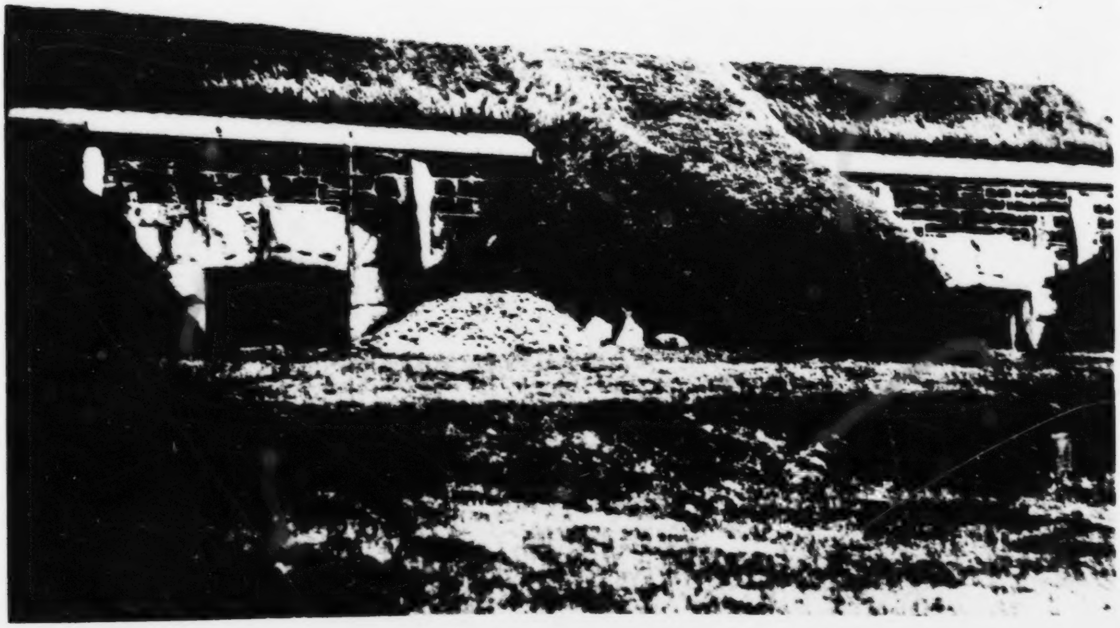


Figure 12. Two casemates - Fort Clarence (ca. 1878). Each of the 11, 9-inch RMLs at Fort Clarence was mounted in a casemate firing through granite embrasures like the two shown in the illustration. Note the earthen traverse betweeen the casemates. The four casemates constructed at Fort Charlotte (for 10-in. RMLs) were constructed in the same manner (see photo 108-02-2-878-0201). (*Public Archives of Nova Scotia.*)

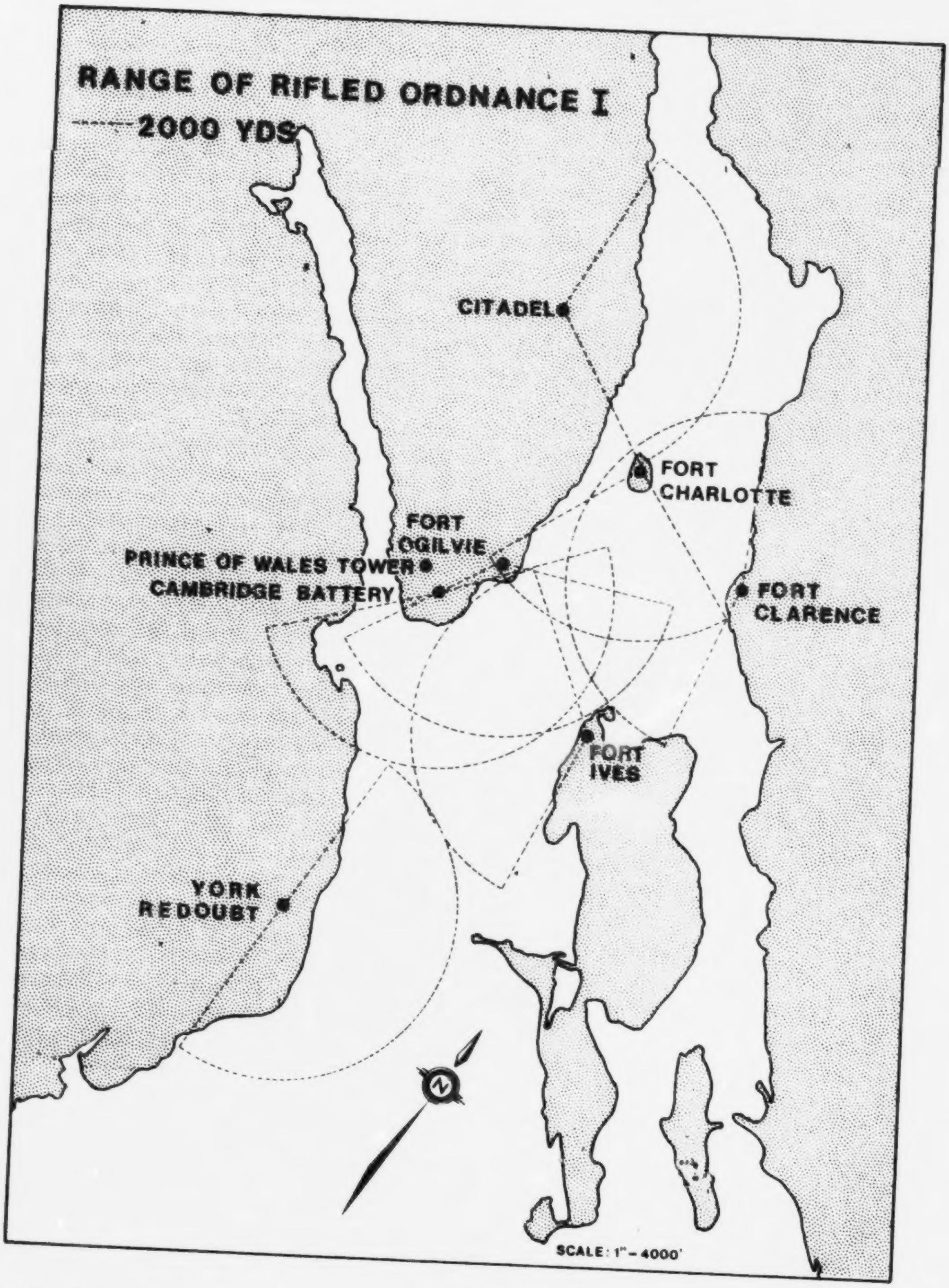

RANGE OF RIFLED ORDNANCE I
2000 YDS
CITADEL
FORT CHARLOTTE
FORT OGILVIE
PRINCE OF WALES TOWER
CAMBRIDGE BATTERY
FORT CLARENCE
FORT IVES
YORK REDOUBT
N
SCALE: 1" - 4000'

Figure 13. Range of rifled ordnance (ca. 1880) - RMLs. Throughout the late 1870s and the early 1880s there were 77 RMLs mounted in 8 fortifications in Halifax: 15, 10-inch, 38, 9-inch, 15, 7-inch and 9, 64-pounders (see Table 10). Although some of the pieces could fire projectiles nearly 6000 yards, the most effective range of the RMLs was considered to be 2000 yards. The 2000-yard arcs on this illustration give an approximate idea of the impressive overlapping fields of fire provided by the RMLs in Halifax. If all the guns could have been manned it would have been a formidable task for any enemy fleet to attempt to force the defences.

1886-1906: BLs and QFs

The first recorded recommendation to mount the new breech-loading guns in Halifax was made in early 1886. At a January meeting of the Royal Artillery and Royal Engineers Works Committee in Great Britain members discussed the need to revise the armament at Halifax. Their main recommendations concerned the outer line of defence. They thought York Redoubt was a well-placed fortification but unfortunately not sufficient. Because of the height of the hill upon which the guns were located there was a considerable expanse of "undefended water in front of the work." It was the committee's opinion that "the approaches and entrances to Halifax should be mainly protected by works on McNab Island, which should be strongly held for this purpose, as well as to prevent its falling into the hands of an enemy." Recommendations to a similar effect had been made over 20 years earlier but not acted upon. The R.A. and R.E. Works Committee urged that a self-contained work be constructed on a rise of land on the southern portion of the island, undoubtedly referring to the hill where Fort McNab was later established. The committee advocated mounting seven of the BLs on disappearing carriages.[145] Within seven months that proposal would be reduced to only four BLs (two 6-inch and two 10-inch, on barbette mountings)[146] but the significant aspect was that the latest weaponry was being recommended for the Halifax defences. In early November 1888, nearly two years after the initial R.A. and R.E. Works Committee recommendation, final authorization was given in the War Office for the construction of what was to become Fort McNab. Four guns were identified (two 10-inch and two 6-inch BLs) and £24,000 were appropriated. The work began during the 1889 building season.[147] Sometime in 1891, as the fort was nearing completion, a decision was made to mount only one 10-inch and two 6-inch guns.[148]

The other recommendations made by the R.A. and R.E. Works Committee in January 1886 were considerably less important. A proposal to erect a new fortification (with seven RMLs) on McNab Island, which would command the Eastern Passage and the shore beyond, was never approved. The remaining suggestions concerned relatively minor modifications to the existing RML forts. At Fort Charlotte, for instance, it was pointed out that two of the 9-inch RMLs in the upper battery should be dismounted as their "fire would be dangerous to buildings in the town opposite."[149] The fact that no BLs were at this time proposed for the RML fortifications was certainly of significance. While the forts and batteries constructed and armed during the 1860s and 1870s were still considered integral to the defence of Halifax, and would continue to be important into the 20th century, the period had passed in which they were to receive top priority for new ordnance. Gradually they were being superceded by newer and better armed fortifications further out to sea, the first of which was to be Fort McNab.

The mid-1880s were noteworthy not only for the introduction of BLs into British coastal defences but also for the development of what were known as "defence schemes" for each of the major fortresses in the Empire. These top secret schemes were in effect carefully prepared contingency plans that identified the most likely types of enemy attack and then specified in considerable detail the steps the defending forces should take to counteract the threat. The need for such plans was brought home to the imperial authorities in 1886 when an attempt made in British waters (in the Milford Haven Experiment) to co-ordinate a combined army and navy force ended in utter failure.[150] It was recognized that in the increasingly sophisticated warfare of the late 19th century, the side better able to co-ordinate its different forces (sailors, gunners, marines, infantry, etc.) would likely prevail in any engagement. As a result it was decided that highly detailed schemes of defence should be drawn up for each of the major imperial fortresses, plans that would outline precisely what had to be done by whom in the event of attack. Accordingly GOCs around the Empire received instructions to draft schemes for the areas under their responsibility. The first Halifax Defence Scheme was prepared in 1887. Nearly every year, until 1905, this initial plan was amended to reflect the many changes that took place in the evolving system of Halifax fortifications.

The first of the more important changes, of course, was the completion of Fort McNab. Once finished in 1892, it became without doubt, the most important of all the harbour defences. When construction on this first BL fort was getting underway Colonel P.E. Hill, the CRA in Halifax, put forward a number of suggestions on other ways in which the defences of Halifax could be improved.[151] The majority of Colonel Hill's recommendations concerned the need for more training and drills in simulated battle conditions. For some of the drills he sought to have greater participation by the militia and the Royal Canadian Artillery, there not being enough Royal Artillerymen in Halifax to man all the guns. This shortage of trained artillerymen was nothing new but it compelled the GOC to propose in the 1890 Halifax Defence Scheme to man, in the event of an attack, only 22 of the 65 RMLs then mounted in the fortifications.[152] Hill's proposals were made in the hope of overcoming that deficiency in manpower. Among his other recommendations was one to cut down the spruce trees in front of the guns at York Redoubt, Cambridge Battery, Fort Ogilvie and Ives Point Battery. The CRA complained that with the trees in the way it was impossible to fire the guns "as they would have to be in war time." Another of Hill's suggestions was to select sites on either side of the main harbour channel and the Eastern Passage in which to install machine guns and what were known as quick-firing (QF) guns. The QFs were small, light breech-loading pieces adopted in the service to fulfill roles that could not be carried out by heavy armament. The rapidity (six aimed rounds per minute) and accuracy of their fire made them ideally suited to defend against enemy countermining and high speed torpedo boat attacks. The massive, long range BLs, or even the RMLs, were helpless against such offensives. The necessity of mounting QFs in the Halifax defences was obvious. By 1891 five 6-pounder QFs had been appropriated for Halifax, three for a location to the right of Ives Point Battery and two for the shore below York Redoubt. They were probably mounted late in 1891.[153] During that same year two new emplacements for 64-pounder RMLs were constructed on the western portion of York Redoubt.[154] The idea behind adding these pieces was to give the work a defence against a possible attack from an enemy landing at

Table 10. Mounted Ordnance (January 1886)[167]

	10-in.	9-in.	7-in.	64-pr	32-pr	8-in. mortar	13-in. L.S. mortar	Total
York Redoubt	3	8						11
Ives Point	3	6						9
Fort Clarence		11			4			15
Fort Charlotte	4	8						12
Fort Ogilvie		5	5					10
Cambridge Battery	5		3					8
P.O.W. Tower				5				5
Citadel			7	4		4	2	17
Totals	15	38	15	9	4	4	2	87

Note: This is a list of the ordnance mounted in the Halifax defences on the eve of the introduction of breech-loading guns (BLs).

Table 11. Characteristics of RMLs (ca. 1884)[168]

Calibre	7-in.	9-in.	10-in.	12.5 in.
Weight of barrel	7 tons	12 tons	18 tons	38 tons
Length of barrel	148 in.	156 in.	171 in.	230 in.
Length of bore	126 in.	125 in.	145.5 in.	198 in.
Weight of projectile	112 lbs	256 lbs	400 lbs	818 lbs
Gun crew	-	9 men	11 men	12 men
Service Charge	30 lbs	50 lbs	70 lbs	200 lbs
Penetration, wrought-iron at 1,000 yards	8 in.	9.9 in.	11.7 in.	17.7 in.
Penetration, wrought-iron at 2,000 yards	-	8.6 in.	10.5 in.	16.1 in.
Velocity at muzzle	-	1440 ft/sec	1379 ft/sec	1575 ft/sec
Velocity at 3000 yards	-	1024 ft/sec	1045 ft/sec	1232 ft/sec
Cost without mounting	540	£848	£1458	£3197
Cost of gun, mounting ammunition (100 rounds) and stores	-	£2450	£3500	£7350
No. in use by R.A. by 1884	154	379	262	127

Note: There were no 12.5-inch RMLs ever supplied to Halifax. Figures relating to its dimensions and capabilities are provided only to give the reader something with which to compare the three calibres of RMLs mounted in the Halifax defences. The largest RMLs constructed were the 17.72-inch models shipped to Malta and Gibraltar. The gun alone cost approximately £16,300, its shot weighed nearly 2000 pounds. It required a gun crew of 90 to operate it.

Herring Cove. The 64-pounders were likely mounted in either 1891 or 1892.

By the mid-1890s the Halifax defences consisted of eight forts and batteries, of which Fort McNab, York Redoubt and Ives Point Battery were unquestionably the most important (Table 12). As for the other works, the general rule was the farther into the harbour, the less important the fortification. Predictably, the Citadel, originally designed for another era of warfare, was considered the least important. In January 1900 its RML armament was no longer even listed among the guns of the fortress, indicating that its defensive usefulness had ended once and for all.[155] While the Citadel declined steadily in importance throughout the 1890s some of the other older works were revitalized with new weapons. Late in the decade emplacements for QFs were constructed at Fort Charlotte (three 4.7-inch QFs), Fort Clarence (two 4.7-inch QFs) and the old smooth bore work, Point Pleasant Battery (two 12-pounder QFs). All seven of these QFs were operational by 1900-1.[156] Although the defensibility of the harbour against torpedo boat attacks was greatly increased with the addition of these QFs, yet another, entirely new, QF fortification was added to the defences at the turn of the 20th century. In 1899 a new battery was commenced on a 60-foot bluff on McNab Island, about one-half mile south of Ives Point Battery. This new work, known as Hugonin Battery, was completed in 1900 when four 12-pounder QFs were mounted.

Table 12. Ordnance to be Manned in the Event of an Attack (1896)[169]

	BLs		RMLs			QFs		
	10-in.	6-in.	10-in.	9-in.	7-in.	64-pr	6-pr	Total
Citadel					4			4
Fort Clarence				3*				3
Fort Charlotte			2	2				4
Cambridge Battery			3					3
Fort Ogilvie				4				4
Ives Point Battery			3	6			3	12
York Redoubt			3	5		2+	2	12
Fort McNab	1	2						3
Total	1	2	11	20	4	2	5	45

* Or 3, 64-pounders, depending on circumstances.
+ To be manned by infantry.

At the same time as additional QF batteries were being established in Halifax the imperial government authorized the reconstruction of four existing works (Forts McNab and Ogilvie, and Cambridge and Ives Point Batteries) and the creation of still another completely new fortification (at Sandwich Point to the south of York Redoubt) so that additional long range BLs could be brought to bear on the approaches to the harbour. The first of these projects to be undertaken was at Fort Ogilvie where the remaining RML emplacements were totally dismantled and replaced by two 6-inch BLs (Mark VII). Similarly, at Cambridge Battery the left and centre faces of the work were reconstructed for two 6-inch BLs (Mark VII) leaving intact only the empty RML emplacements on the right face. The work at Ives Point Battery involved the destruction of all six 9-inch RML emplacements on the right face and building in their place emplacements for two 6-inch BLs (Mark VII) and two 12-pounder QFs. The three emplacements on the left face, for 10-inch RMLs, were left untouched and two 10-inch RMLs were still mounted there in the summer of 1977. In the January 1904 Halifax Defence Scheme all of the new pieces for these three batteries were listed as operational.[157] The work at Fort McNab and at Sandwich Point was not completed until 1904-5, when the handing over the defences to the Canadian government was imminent. At Fort McNab the three BLs (one 10-inch and two 6-inch), which had been mounted there for slightly over a decade, were now considered outdated.

Table 13. Mounted Ordnance (1905)[170]

	BLs			QFs		
	9.2-in.	6-in.	4.7-in.	12-pr	6-pr	Total
Fort McNab	1	2				3
Sandwich Battery	2	2				4
Below York Redoubt					2	2
Hugonin Battery				4		4
Ives Point Battery		2		2	2	6
Point Pleasant Battery				2		2
Cambridge Battery		2				2
Fort Ogilvie		2				2
Fort Charlotte			3			3
Fort Clarence			2			2
Total	3	10	5	8	4	30

In their place the British authorities intended to substitute two 9.2-inch BLs (in fact only one was ever mounted) and two improved models (Mark VII) of the 6-inch BL. The changes were made to increase the effective range of the guns at this most important defence. To illustrate, a 9.2-inch BL (weighing 27 tons) could fire a 380-pound projectile up to a distance of 34,000 yards; the range of its predecessor the 10-inch BL (weighing 32 tons) extended only up to about 19,000 yards. It was to give the Halifax fortifications a balanced defensive capability in the outer harbour that a new BL battery was established on top of the 200-foot cliff at Sandwich Point. When completed this new defence, Sandwich Battery, mounted the heaviest ordnance of all the sites in Halifax: two 9.2-inch BLs and two 6-inch BLs (Mark VII). In conjunction with Fort McNab it provided extremely effective coverage of the approaches to Halifax, up to a distance of approximately six miles.

Sandwich Battery was the last fortification to be built by the British during the century and a half in which they garrisoned Halifax. Soon after it was completed arrangements were finalized between Great Britain and Canada to hand the fortifications over to the control of the latter government. The last of the imperial troops departed in the spring of 1906 when the Royal Engineers sailed out of the harbour. The Royal Navy left the following year. For several years before the eventual withdrawal, pressure had been growing in Great Britain to concentrate its forces closer to home, where the steady growth of the German army and navy seemed to be the most pressing defensive worry. This act combined with a gradual rapprochement with the United States forced a reappraisal of Halifax's strategic importance in the total imperial context. The final decision was in favour of withdrawal as soon as it could be made acceptable to the Canadian government. The transfer of control in 1906, however, did not by any means signify the end of usefulness of the Halifax fortifications. Many of the forts and batteries constructed by the British during the last 50 years of their stay continued to play important roles. Under Canadian control works built and armed by the British contributed to the defence of Halifax in the two world wars of the 20th century.

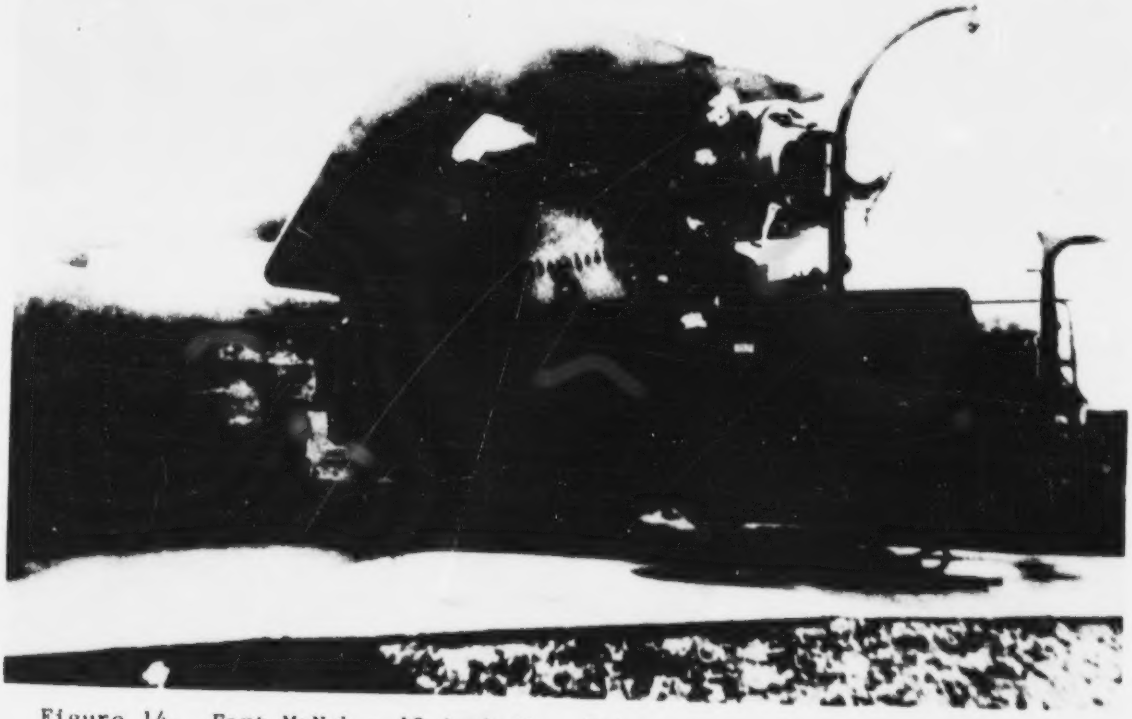


Figure 14. Fort McNab - 10-inch BL. This seems to be a photograph of the 10-inch BL mounted in Fort McNab from 1892 to the early 1900s. It was the only 10-inch BL ever mounted in the fortifications of Halifax. Originally it had been planned to mount 2, 10-inch guns in Fort McNab, but that decision was later altered (apparently in 1891). Weighing 32 tons, the 10-inch BL weighed nearly twice as much as the 10-inch RML, which was the heaviest gun mounted at Halifax during the 1870s and 1880s. Between 1901 and 1904 this 10-inch BL was replaced by a 9.2 inch BL. (*Public Archives of Nova Scotia.*)

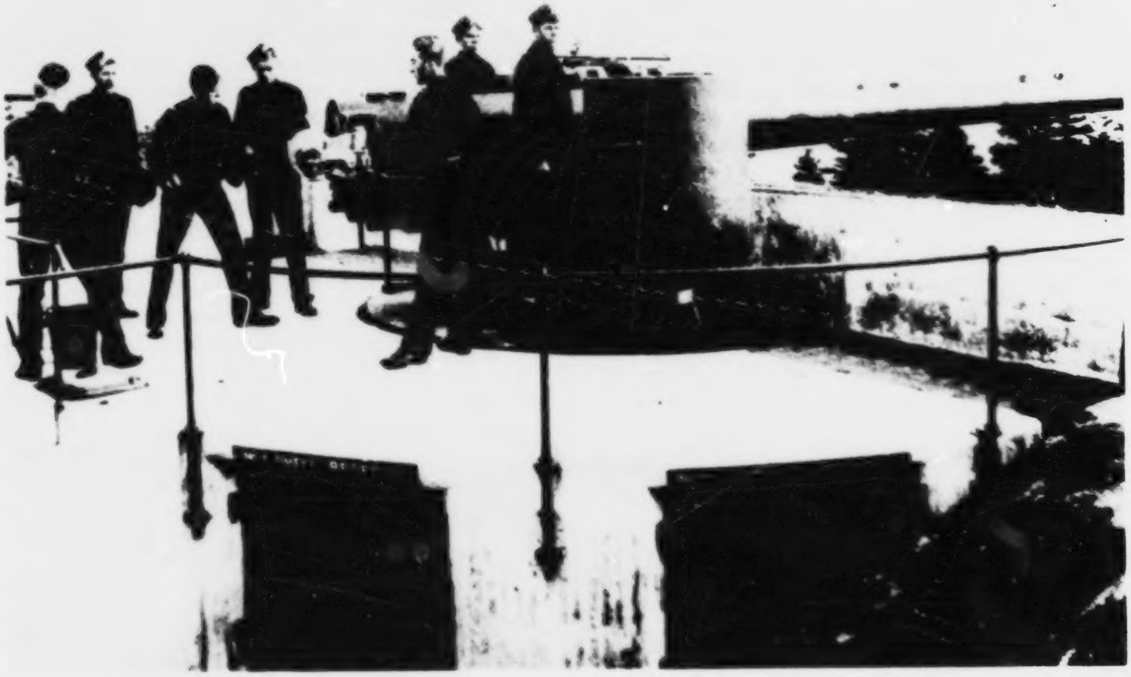


Figure 15. Fort Ogilvie. This is an excellent photograph of an artillery crew working 1 of the 2, 6-inch BLs installed at Fort Ogilvie between 1901 and 1904. (*Public Archives of Nova Scotia.*)

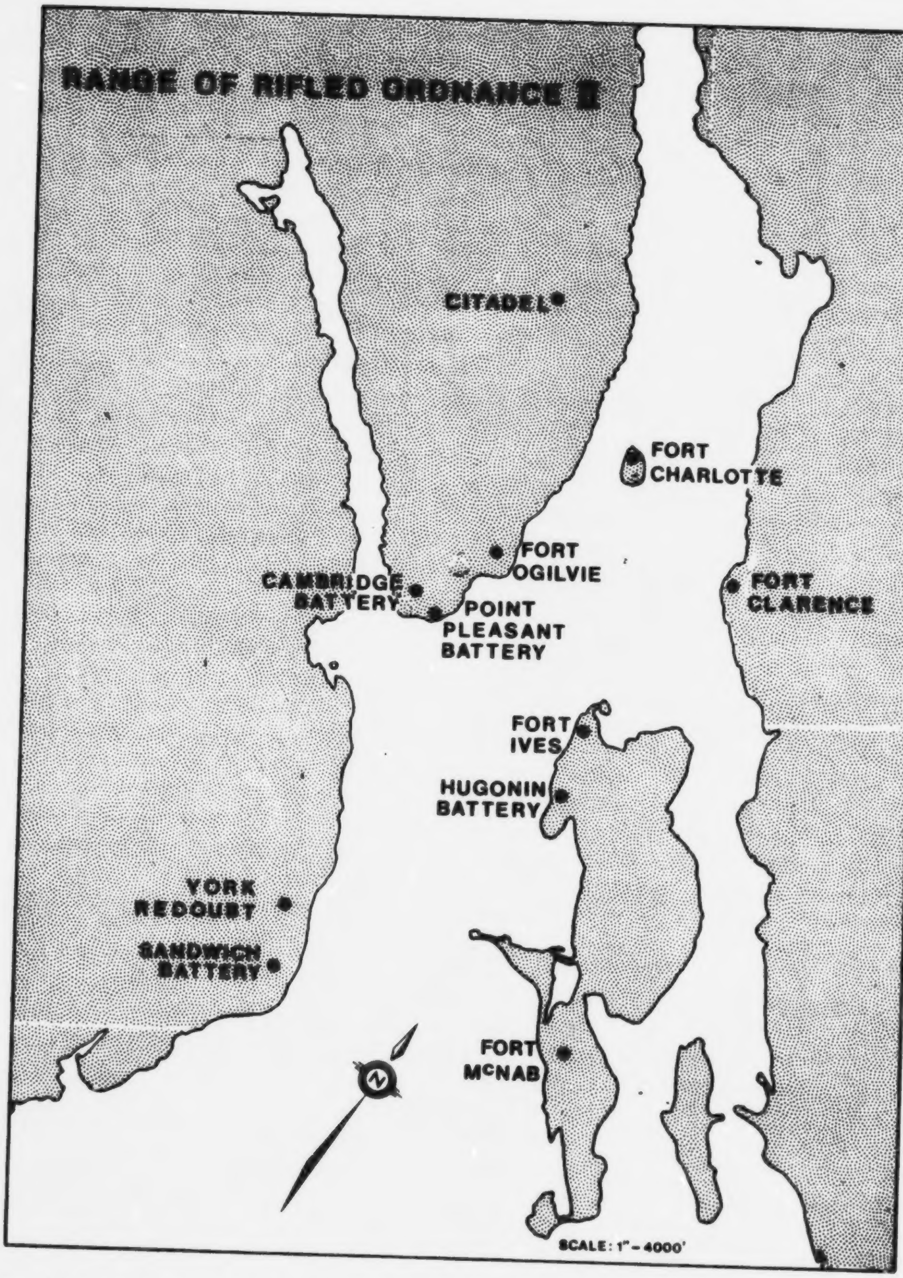

RANGE OF RIFLED ORDNANCE III
CITADEL
FORT CHARLOTTE
FORT OGILVIE
CAMBRIDGE BATTERY
POINT PLEASANT BATTERY
FORT CLARENCE
FORT IVES
HUGONIN BATTERY
YORK REDOUBT
SANDWICH BATTERY
FORT McNAB
N
SCALE: 1" – 4000'

Figure 16. Halifax defences (1905). This plan locates the 10 fortifications that mounted BLs and QFs at the end of the British period. The Citadel was not one of these forts and batteries, but is shown simply for orientation. The particular guns mounted in each of the fortifications in 1905 are listed in Table 13. The range of the guns from each battery is not shown as they were in the tens of thousands of yards.

CITADEL - SMOOTH-BORE ORDNANCE

The Early Proposals

When Colonel Gustavus Nicolls submitted his original estimate and plans in 1825 for the construction of a masonry bastioned fort on Citadel Hill, he included a list of the ordnance he envisioned mounting in the new work[1] (Table 14). He provided for most of the required curbs and platforms in the estimate.[2] In the CRE's opinion his design called for a total of 67 pieces (35, 24-pounder carronades, 28, 24-pounder guns and 4, 13-inch mortars). On the ramparts of the body of the fort, Nicolls proposed 16 pieces: one 24-pounder gun on a traversing platform at each of the four salient angles, two 24-pounder carronades on granite-ground platforms above each of the four flanks and two 13-inch mortars in each of the southwest and northwest demi-bastions. He recommended that seven 24-pounder guns on traversing platforms be mounted on each of the two proposed cavalier barracks. For the four ravelins he suggested a total of 10, 24-pounder guns and 11, 24-pounder carronades, all of the pieces to be on ground platforms except for the ones at the salient angles which would be on traversing platforms. Finally, he proposed that a 24-pounder carronade be mounted in each of the 16 defence casemates situated beneath the ramparts and two to flank the ditch of each face of the four ravelins.

Table 14. Citadel Armament Proposal (1825)[121]

	Guns 24-pr	Carronades 24-pr	Mortars 13-in.	Total	Platforms
Body of the Work					
Salient Angles	4			4	traversing
Northwest demi-bastion			2	2	ground
Southwest demi-bastion			2	2	ground
Flanks of each demi-bastion		8		8	ground
Defence casemates		16		16	(not given)
Cavaliers					
Cavalier A	7			7	traversing
Cavalier B	7			7	traversing
Ravelins					
North	4	2		6	5 ground 1 traversing
West	1	4		5	4 ground 1 traversing
South	4	2		6	5 ground 1 traversing
East	1	3		4	3 ground 1 traversing
Total	28	35	4	67	

Nicoll's ideas on Citadel ordnance were probably not submitted as a formal armament proposal because in July 1828, 11 days after the Citadel project was finally approved, the Inspector-General of Fortifications (IGF) requested the CRE to provide "a statement shewing [sic] the number and nature of the guns that may be required."[3] Colonel Nicolls forwarded the same recommendations for permanent armament he had made in 1825. In addition, he identified a need for another 18 pieces (eight 32-pounder guns and ten 24-pounder guns) to be used in the event of a siege.[4] There is no record of any official reaction from the Board of Ordnance to Nicolls' suggestions concerning the type, calibre and location of armament for a completed Citadel. Perhaps the Board wished to wait until the construction was more advanced before determining the necessary pieces.

Colonel Nicolls' armament suggestions reflected his contention, and that of the Smyth Commission, that the most important role for a fort on Citadel Hill was in the land defence of Halifax. Indeed, a work on Citadel Hill could contribute little to the defence of the harbour given its distance from the water and the limited range of the smooth bores. To illustrate, George Island lay approximately 2000 yards to the southeast, at which distance the Citadel's ordnance could be expected to be no more than 45-50 per cent accurate against moving ships. At 3000 yards, slightly more than the distance across the harbour from the Citadel's east front, the accuracy of the smooth bores dropped to about 8 or 9 per cent.[5] Obviously, the Citadel could only play a secondary or supporting role in defending the harbour. On the landward side, however, the Citadel was considered by Nicolls to be very important to the defence of Halifax. Of the 51 pieces the CRE proposed mounting permanently to cover the glacis and terrain beyond, well over one-half were to face west or north, the directions from which overland assaults might be made. All of the mortars were to be mounted on the west front and all of the guns on the two cavaliers were to face either west or north. Presumably, a majority of the 18 guns to be added to the armament in the event of a siege would also have been mounted so they could train their fire on the northern or western approaches.

The CRE believed that the short northern front was the weakest in the fort, although not the most likely to be attacked. The nearest high ground to the north was Needham Hill, 2732 yards away. An enemy battery established there could not have done much damage to the Citadel, although it certainly could have created havoc in the Naval Yard and harass ships in the harbour. Of more importance to the Citadel's defence was the maintenance of possession of Windmill Hill (now known as Camp Hill). It was an uncomfortably close 666 yards away and only 43 feet lower than the west front. In Colonel Nicolls' words, it was the ideal location for "breaking ground against the fort."[6] From that short distance the artillery fire of well-trained enemy siege batteries would have had a devastating effect on the walls and other structures of the Citadel.[7] In recognition of the likelihood of attack from the west the Deputy IGF suggested to Nicolls that a cavalier be constructed in each of the southwest and northwest demi-bastions rather than behind the west and north curtain walls, because he thought they might serve as "a powerful Blockhouse or Retrenchment ... without lessening in any degree the accommodation for the troops and stores."[8] The CRE disagreed, maintaining that the cavaliers could contribute more to the Citadel's defence if they were built where he originally proposed. As far as their utility during the later stages of a siege when the enemy might have made a breach in the walls, Nicolls pointed out that the lower doors and windows could be built up so as "to form a most powerful retrenchment."[9]

In 1831, the final year in which Colonel Nicolls served as the CRE in Nova Scotia, he proposed two major alterations to his initial design, both of which had implications for the armament of the Citadel. The first concerned the north cavalier, the construction of which had not commenced. Rather than erecting a large barracks as he had originally proposed, Nicolls suggested that a smaller structure be built in the north end and that a third cavalier be constructed in the southwest corner of the parade to provide the accommodation that would otherwise have been lost. With its dimensions reduced the north cavalier would be able to mount only four guns, not seven. The barracks in the southwest corner would mount the other three guns. Thus, the total number of guns mounted on Citadel cavaliers would have remained the same (14, 24-pounders) but the disposition would have changed to permit much greater coverage of the southern front and less on the north (Fig. 17.)

The second, more drastic modification proposed by Colonel Nicolls was the construction of a redan on the east front instead of the ravelin. The merits of such a proposal were obvious. A redan would provide badly needed interior space to the fort and allow more armament to be mounted on the east front than had been possible in the original plan. Whereas the east ravelin had been designed to mount only four pieces of ordnance, Nicolls proposed mounting nine pieces on a redan. Hence, the Citadel's contribution to the defence of the harbour would be greatly enhanced, although in that respect it would still play no more than a supporting role to Fort Charlotte and Grand Battery. Colonel Nicolls did not specify the ordnance he wished to see mounted if the redan design was accepted, but one can probably assume he had 24-pounder guns in mind. The range of the 24-pounder gun was roughly double that of the 24-pounder carronade, the other piece of ordnance he seems to have favoured for the Citadel, (2450 yards to 1120 yards with both at 10° elevation).[10] Certainly when Nicolls' successor, Lieutenant-Colonel Richard Boteler, turned briefly in 1832 to the question of arming the proposed redan, he recommended 24-pounder guns.[11]

In the event that a redan was built on the east front, Colonel Nicolls proposed that four additional defence casemates be constructed to provide flanking fire along the ditches of the east faces of both the northeast and southeast salients. Once again, he did not specify the ordnance, but one can be virtually certain that he wished to see 24-pounder carronades mounted in these casemates as that was what he recommended for the other 16 casemates.[12]

In late October 1831, Lieutenant-Colonel Richard Boteler arrived in Halifax to assume Nicolls' command. The new CRE's main concern during his stay in Halifax (1831-33) was with the structural and financial problems the Citadel project was encountering. Boteler did find time, however, to record his thoughts on the armament a completed Citadel would require. His ideas coincided almost exactly with Nicolls'.[13]

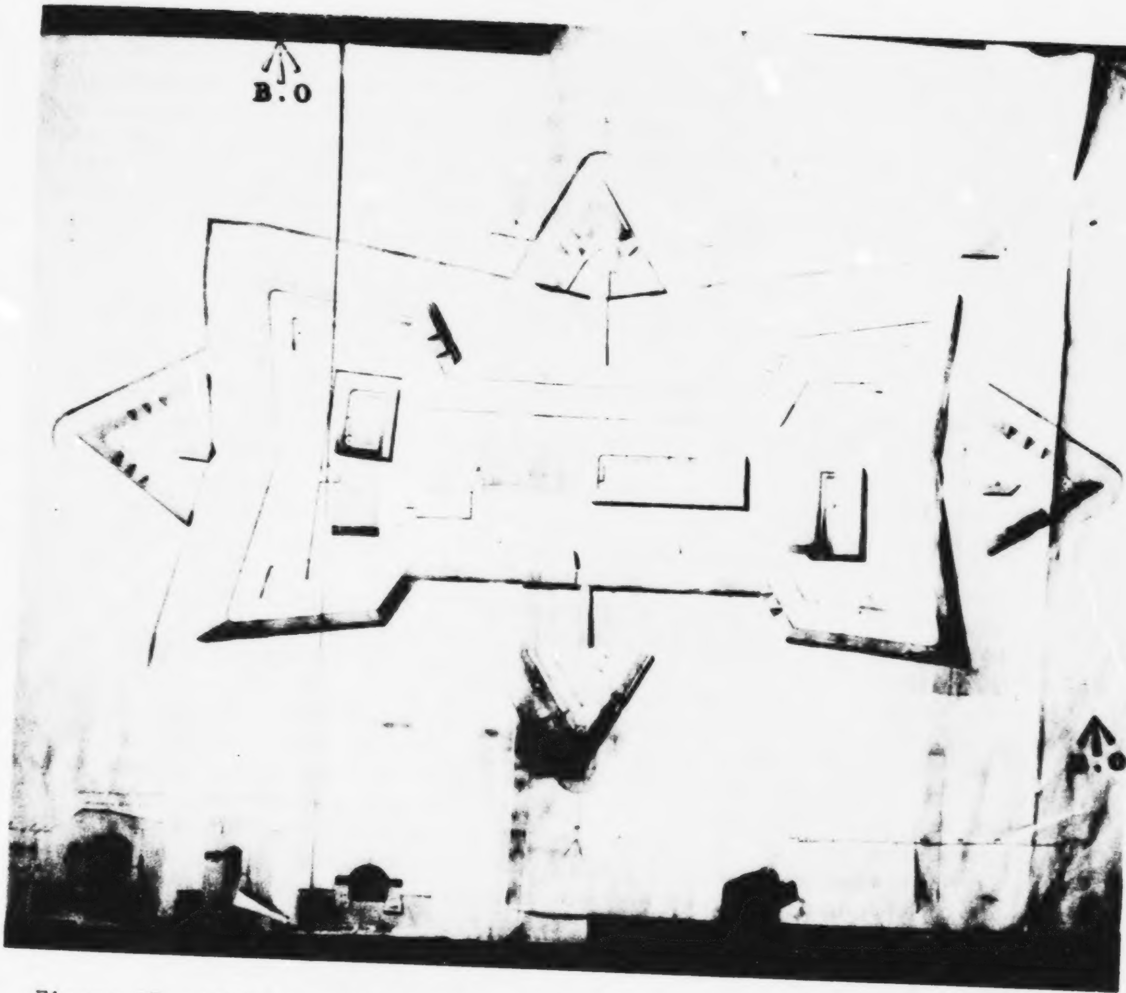


Figure 17. Plan of Citadel (1832). Although strictly speaking this plan of Lieutenant-Colonel Boteler is not the Citadel design originally conceived by Lieutenant-Colonel Nicolls (when only 2 cavaliers were proposed), it does give an excellent indication of the general attitude towards arming the fort before the decision was made to build a redan on the east front. The greatest concentration of ordnance, including all four mortars, was to be on the west front. This allocation was based on a belief that an attack was most likely from that direction. This plan calls for the mounting of a total of 69 pieces: 16 in defence casemates (indicated by the letter W), 14 on three cavaliers, 23 on the four ravelins and 16 on the ramparts. (Nicolls in his 1825 proposal had listed only 21 for the four ravelins.) Subsequent armament proposals greatly increase the number of pieces to be mounted on the ramparts of the body of the work. (*Public Record Office.*)

One minor difference was that Boteler foresaw the need for only seven 24-pounder guns on the redan ramparts (presumably three on each face and one at the salient) rather than nine. A second modification the CRE proposed was mounting one additional 24-pounder carronade on the east faces of both the north and south ravelins. As with Nicolls' armament suggestions, those of Lieutenant-Colonel Boteler did not receive either approval or criticism. In fact, the question of arming the Citadel did not arise again for more than a decade.[14]

The 1846 Proposal

Between 1840 and 1842 the ironstone and granite exterior of the Citadel was finally completed. The attention of the CRE could at last turn to the task of making the new fort a functional work of defence. Questions concerning accommodation, storage and ordnance became pre-eminent. The latest CRE, Lieutenant-Colonel Patrick D. Calder, the fifth to oversee the project since 1828, first approached the ordnance question in his supplementary estimate of 31 March 1846. Calder provided the specifications and plans for circular curbs and pivots, segmental curbs and pivots and stone-ground platforms[15] (Figs. 18-20). As there was not yet an approved armament proposal for the Citadel, he made no mention of the particular pieces to be mounted, nor was he able to list quantities beside each of the items. The best he could do was to propose in a general way at the end of the estimate the types of platforms and approximate location where they might be mounted. The CRE suggested that there might be one traversing platform at each salient of the body of the work, two "Garrison Platforms" above each flank of the southwest and northwest demi-bastions, two mortar platforms in each of the demi-bastions and six platforms on the north front and four on the east front of an unspecified type. It seems that Calder based his list on Nicolls' and Boteler's earlier armament proposals as it envisioned roughly the same number and disposition of ramparts' ordnance as they had recommended. In addition to these tentative suggestions for the ramparts, Calder provided in the estimate for curbs and pivots for the cavalier terreplein and for curbs, platforms and embrasures for the west ravelin. He did not identify any special platforms or curbs to be installed in the 20 defence casemates.

The IGF, J.F. Burgoyne, expressed cautious approval of the items in the estimate relating to ordnance but he pointed out that a formal armament proposal would have to be drawn up. He directed Calder to consult with the CRA in Halifax and forward a proposal to the local commander of the forces for approval.[16] Accordingly, Calder and Lieutenant-Colonel Jackson (CRA) drafted an armament scheme in the early summer of 1846. It was submitted to London on July 21.[17]

The 1846 proposal differed considerably from all earlier suggestions, both in the number and nature of guns to be mounted and in their location (Table 15). Both Nicolls and Boteler in their proposals for the Citadel redan design advocated mounting about 75 pieces from three different categories of ordnance (24-pounder carronades, 24-pounder guns and 13-inch mortars). They envisioned mounting only about 20 of those pieces on the ramparts of the body of the work. Lieutenant-Colonels Calder and Jackson proposed mounting a total of 94 pieces with 48 of those identified as ordnance for the ramparts. Not only did Calder and Jackson wish to see more pieces on the ramparts, but the ones they identified had considerably longer ranges and fired a heavier shot than those recommended by their predecessors. The most common piece was the 32-pounder gun (9 ft, 6 in.), with an extreme range of 3000 yards at 10° elevation. The maximum ranges of the 24-pounder

Table 15. Citadel Armament Proposal (1846)[122]

	Guns				Platforms	Howitzers	Mortars		Platforms	Total
	8-in. (9'0")	32-pr (9'6")	32-pr (6'6")	24-pr (6'0")		8-in.	13-in.	8-in.		
Body of the Work										
Salients	5				ordinary traversing					5
Northwest Demi-Bastion										
Right face		2			block traversing			2	ground	4
Left face		2			block traversing	1			ground	3
Flank			2		ground					2
Curtain						2	2		ground	4
Southwest Demi-Bastion										
Flank		2			ground					2
Right face		2			block traversing	1			ground	3
Left face		2			block traversing			2	ground	4
Southeast Salient										
Right face		1			block traversing			2	ground	3
Left face		2			block traversing	1		1	ground	4
Redan										
Right face		2			block traversing	1			ground	3
Left face		2			block traversing	1			ground	3
Northeast Salient										
Right face		2			block traversing	1		1	ground	4
Left face		2			block traversing			2	ground	4
Total for Ramparts	5	21	2			8	2	10		48
Defence casemates				20	(not given)					
			20							
Cavalier		7			ordinary					
			7		traversing					
North Ravelin										
Salient		1			ordinary traversing					1
Faces			6		ground					6
West Ravelin										
Salient		1			ordinary traversing					1
Faces			4		ground					4
South Ravelin										
Salient		1			ordinary traversing					1
Faces			6		ground					6
Total for Citadel	5	31	18	20		8	2	10		94

guns and 24-pounder carronades proposed by Nicolls and Boteler were 2450 yards and 1120 yards, respectively.[18] In addition to the 32-pounders, Calder and Jackson suggested including 20 mortars and howitzers in the Citadel's armament. The 1846 scheme called for mounting the cavalier and the ravelins exclusively with 32-pounder guns, albeit of different lengths and therefore slightly different ranges. The earlier proposals had listed the less effective 24-pounder guns and 24-pounder carronades. For the 20 defence casemates, Calder and Jackson substituted short 24-pounder guns (6 ft) for the 24-pounder carronades proposed earlier. Given the distances to be covered in protecting the ditch of the Citadel, the substitution was not significant; either piece could have performed the task adequately.

Appended to the armament proposal were new and more detailed suggestions for platforms. Calder and Jackson named four different types of platforms they wished to use: ordinary traversing platforms, block traversing platforms, Lieutenant-Colonel Alderson's siege platforms and stone platforms. They proposed mounting 15 guns on ordinary traversing platforms; the 8-inch guns at the salients, the long 32-pounder guns (9 ft, 6 in.) at the salients of the ravelins and all the 32-pounders (9 ft, 6 in.) on the cavalier. The 19 long 32-pounders on the faces of the redan, north, south, east and west fronts were all to be mounted on block traversing platforms. All of the mortars and howitzers as well as the four 32-pounder guns in the flanks of the demi-bastions were to be mounted on Lieutenant-Colonel Alderson's siege platforms (Figs. 22 and 23). Those 24 platforms were "to be kept in store for their preservation and the guns to be skidded in position" when needed. Similarly, the embrasures "may be cut through the Parapet" when the situation warranted it.[19] Finally, it was stated that stone platforms (Fig. 24) and curbs were already laid in the south and north ravelins. The platforms for the west ravelin were not mentioned in this listing, probably because a detailed plan showing a circular curb at the salient and four stone-ground platforms on the faces had been submitted with the initial estimate of March 31 (Fig. 25). Once again, there was no mention of the platforms or carriages upon which the CRA and CRE wished to see the short 24-pounder guns (6 ft) in the 20 defence casemates mounted.

Less than two months after the CRE's and CRA's armament proposal was forwarded to London, the Director-General of Artillery gave it his approval.[20] On 2 October 1846 it was approved by the Board of Ordnance.[21] Eighteen years had passed since approval had been granted for the construction of a masonry bastioned fort on Citadel Hill. At last, preparations could begin for arming the fort.

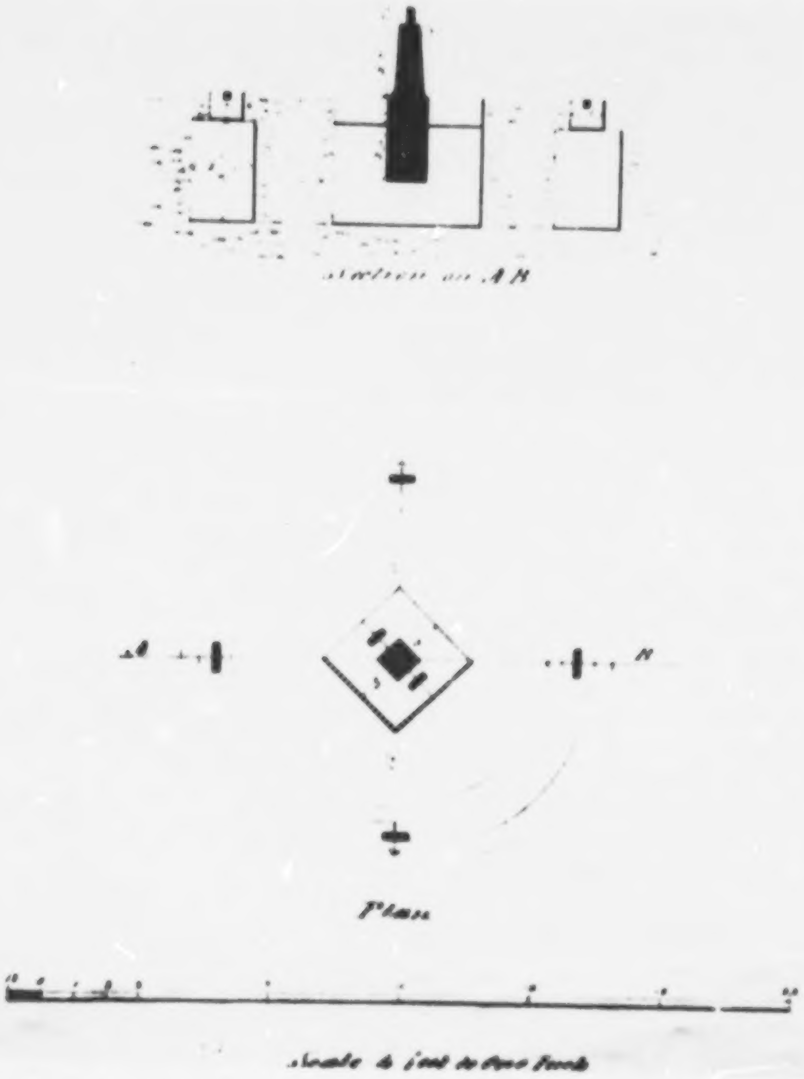


Figure 18. Circular granite curbs. Granite curbs of this design were first proposed in the supplementary estimate of 31 March 1846. As there was no approved armament proposal for the Citadel at that time, the CRE, Lieutenant-Colonel Calder, was unable to identify how many of these curbs he envisioned constructing in the fort or exactly where they should be located. After an armament proposal for the Citadel was approved in October 1846, Calder drew up a revised estimate to reflect the decisions made on how best to arm the fort. The CRE entered no figures beside the item for circular granite curbs, thereby indicating that none were to be constructed on the ramparts of the body of the work. Circular granite curbs of this basic design were ultimately constructed in only 5 locations in the Citadel, 1 at either end of the battery on the cavalier and 1 at each of the salient angles of the 3 ravelins (see Fig. 24). In each case long (9-ft, 6-in.) 32-pounder guns on common traversing platforms were mounted above them. According to the correspondence of Colonel Nelson, the CRE in 1860, the customary iron racers were never laid upon these or any other granite curbs in the Citadel. (*Public Archives of Canada.*)

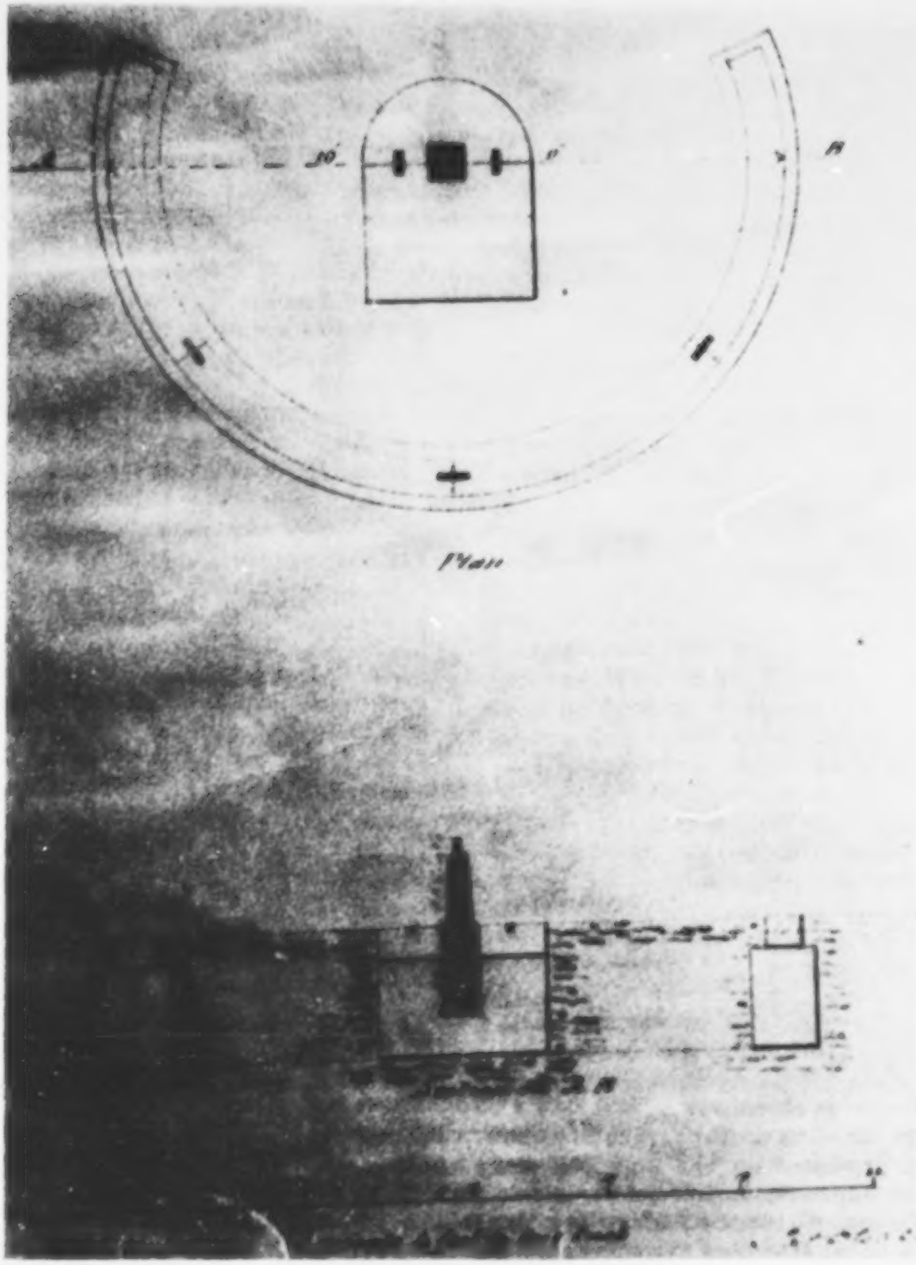


Figure 19. Segmental granite curbs. Like the circular curbs shown in Figure 18, this type of granite curb was first proposed in the supplementary estimate of 31 March 1846. In the revised estimate forwarded to London after an armament proposal was approved for the Citadel in October 1846, the CRE indicated that 5 curbs of this design were to be constructed on the ramparts of the fort. To judge from plans of the Citadel ramparts in the 1850s, granite curbs of this design were laid at each of the 5 salients, with the curb toward the front of the emplacement and the pivot behind (at what is known as "D" or intermediate pivot position). An 8-inch gun (Millar pattern) was mounted on a common traversing platform above each of these 5 all-granite curbs. (*Public Archives of Canada.*)

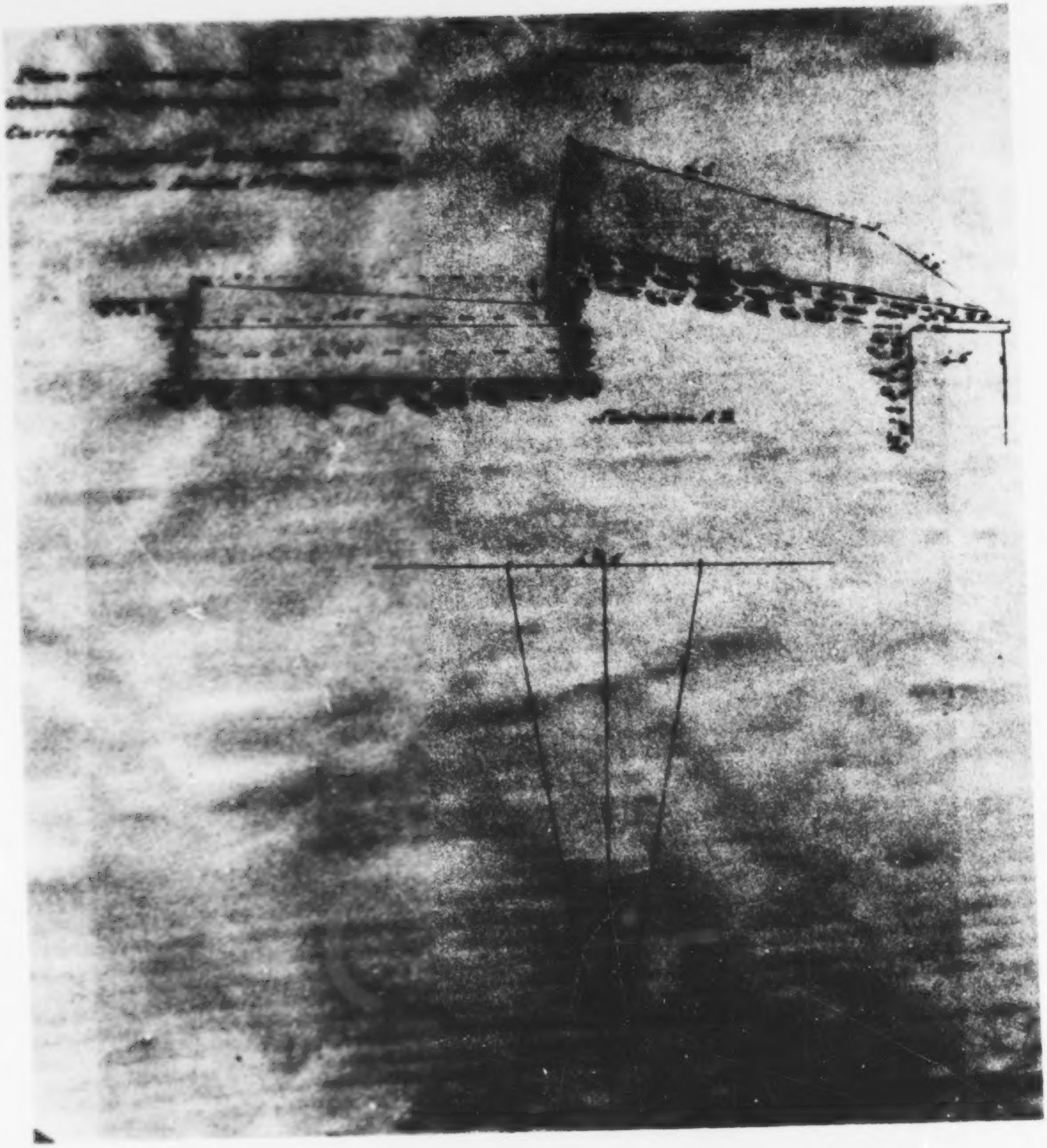


Figure 20. Granite-ground platforms proposed for ramparts (1846). Granite platforms of this type were identified for the Citadel ramparts in the supplementary estimate of 31 March 1846. With the approval of the Citadel's armament in October 1846, the decision was made not to construct any of these enormously heavy ground platforms on the ramparts of the body of the work but to have each piece in the permanent ordnance mounted on traversing platforms. The two kinds of curbs constructed on the ramparts are illustrated in Figures 19 and 21. Granite-ground platforms of a slightly different design (see Fig. 24) were ultimately laid only above the faces of the ravelins. In these locations the heavy weight of the platforms was much less likely to create problems than on the ramparts where there were casemates beneath. (*Public Archives of Canada*.)

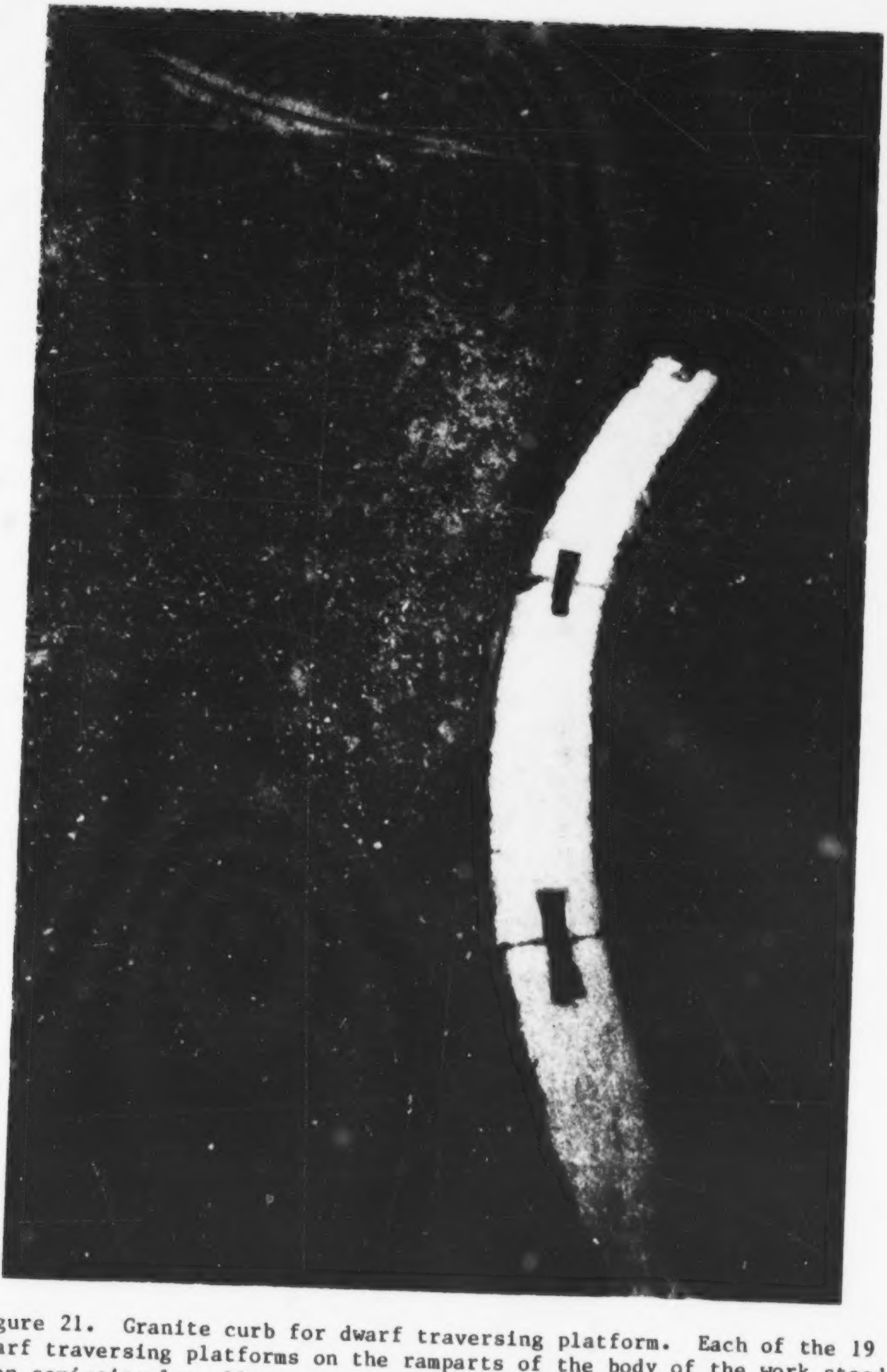


Figure 21. Granite curb for dwarf traversing platform. Each of the 19 dwarf traversing platforms on the ramparts of the body of the work stood upon semi-circular all-granite curbs. This is a photograph of one of these curbs still visible on the ramparts of the Citadel. In the background, a portion of the wrought-iron racer and granite curb for a 7-inch RML, mounted much later, is visible.

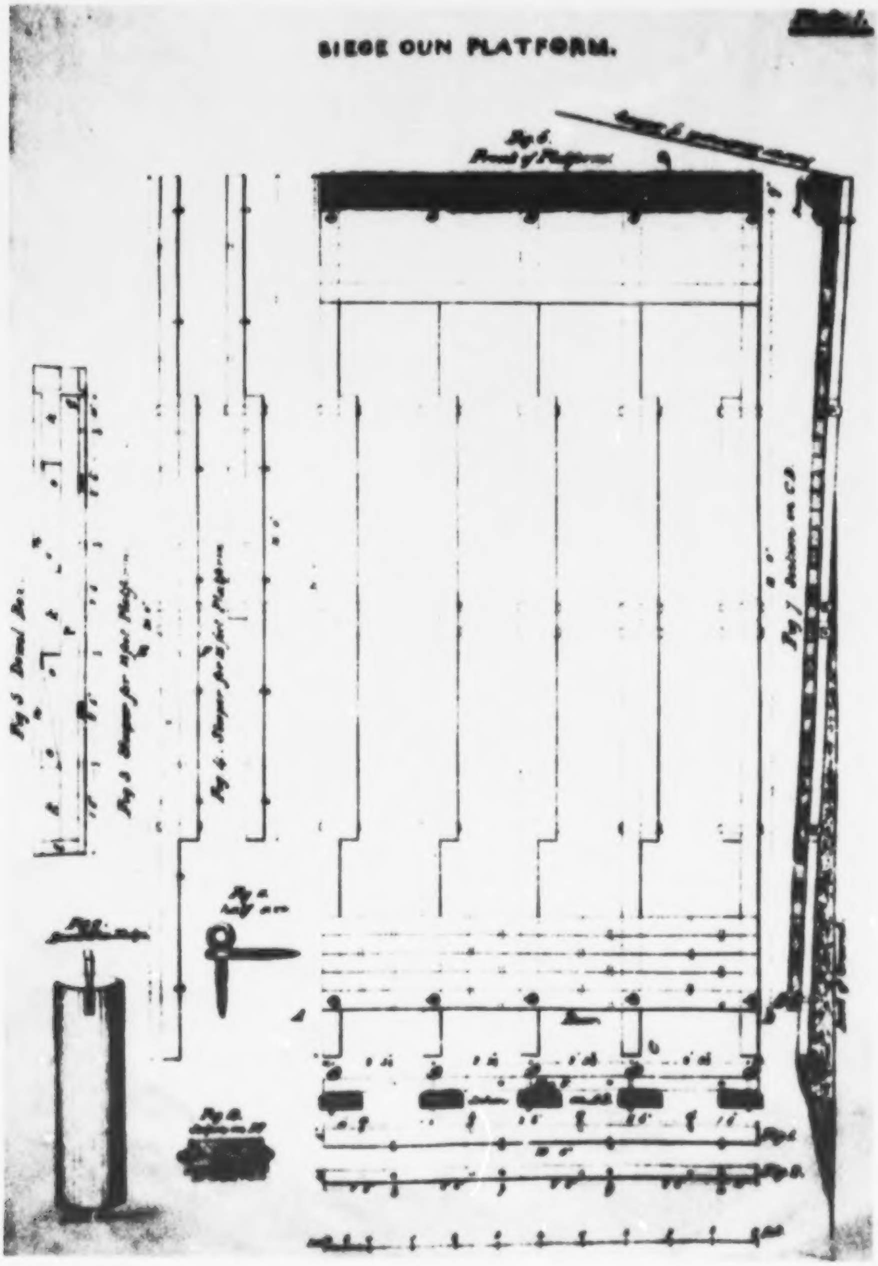


Figure 22. Siege gun platform. Twelve of the pieces in the reserve ordnance of the citadel (8, 8-in. howitzers, 2 long 32-pounder guns and 2 short 32-pounder guns) were to have been mounted on this type of platform, if the fort was ever attacked. The platforms were designed so that they might be easily assembled when needed and neatly stored away in peace time. There is no evidence as to where they were stored in the Citadel, but it seems likely that they would have been kept in one of the casemates appropriated to ordnance stores. The locations where these 12 platforms were to be laid and pieces mounted upon are shown in Figure 29. This platform seems to have been the type often referred to as Lieutenant-Colonel Alderson's gun platform. (*Public Archives of Canada.*)

Figure 23. Siege platforms for 10-inch and 13-inch mortars. These platforms were very similar to the one shown in Figure 21 but they were of considerably stronger construction so they could bear the heavier weight and force of a firing mortar. Each of the 12 mortars in the Citadel's reserve ordnance (2, 13-in. and 10, 10-in.) were to be mounted on either one of these two platforms in the event that the fort was besieged. The locations where they were to have been laid, with mortar beds and the mortars themselves on top of them, are shown in Figure 29. Presumably the component parts for these platforms would have been stored near those described in Figure 22, probably in the same casemate. These platforms appear to have been the ones referred to as Lieutenant-Colonel Alderson's mortar platforms. (*Public Archives of Canada.*)

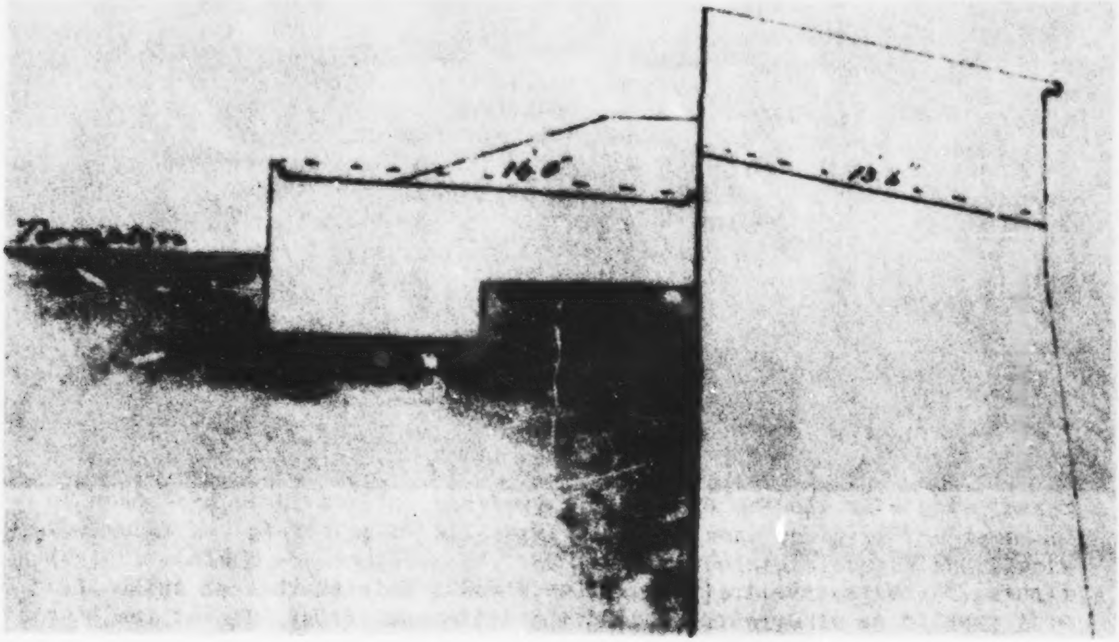


Figure 24. Plan of granite-ground platform - west ravelin (1846). There were 16 granite-ground platforms constructed in the Citadel, 6 on each of the north and south ravelins and 4 on the west ravelin. According to a note on the revised version of the 31 March 1846 estimate, they were all to be of the same design, presumably the same as this design submitted for the west ravelin in March 1846. Note the differences between this platform and the ones originally proposed for the ramparts of the body of the fort (see Fig. 20). Two of the 4 granite-ground platforms originally constructed on the west ravelin are still extant. All of the ones on the south ravelin were either removed or buried when the ravelin ramparts were reshaped for rifled ordnance. While the north ravelin was also reconstructed so that it might be capable of mounting a rifled gun, one of the granite-ground platforms from the smooth-bore era was left more or less intact. (*Public Archives of Canada.*)

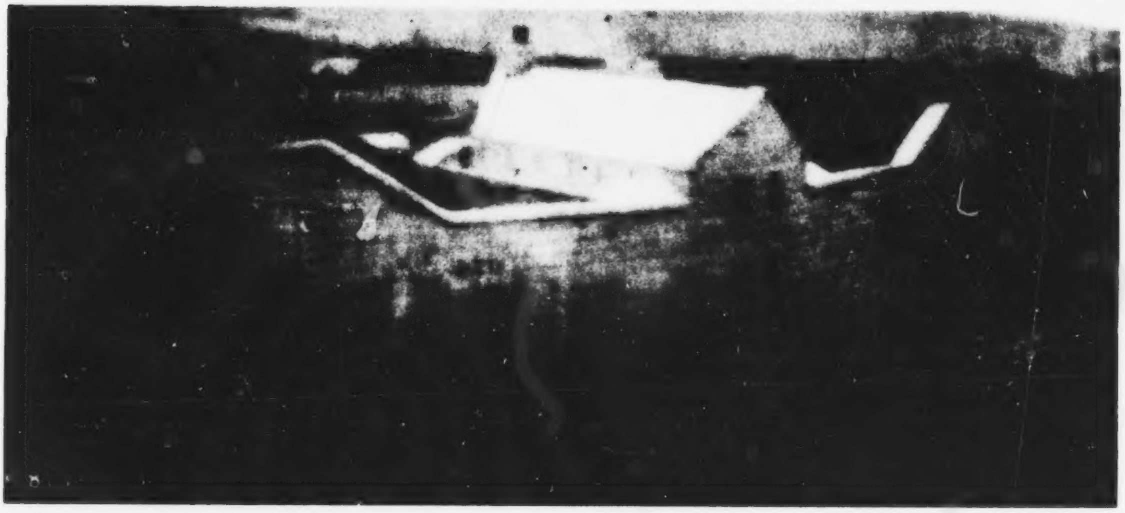


Figure 25. West ravelin (late 1850s-1860s). This photograph shows the west ravelin as it appeared during the 1850s and 1860s. Two of the 5 smooth-bore guns mounted on the ravelin are visible. Firing *en barbette* at the salient is a 32-pounder gun (9 ft, 6 in.) mounted on an iron common traversing platform. The gun of the wooden garrison carriage standing on the granite-ground platform to the right is a shorter 32-pounder gun (6 ft, 6 in.). There were short 32-pounders mounted in the same fashion at each of the other 3 granite embrasures. (*Public Archives of Nova Scotia.*)

Arming the Citadel

To begin with, the requisite carriages, pivots, racers, platforms and the pieces of ordnance themselves had to be ordered. All of the items, with the exception of the stone-ground platforms, which would have to be constructed locally, had to be obtained from Great Britain, mostly from the departments of the Royal Arsenal in Woolwich. Sometime after the armament proposal was approved, Lieutenant-Colonel Calder forwarded a revised version[22] of the supplementary estimate he had submitted on 31 March 1846. In this version of the estimate Calder made several significant modifications to the items providing for curbs and platforms. It is unknown whether the CRE made these changes on his own initiative, after further discussions with the CRA or after receiving direction from his superiors in the Board of Ordnance. In any case, the new items give a more complete picture of the platforms and curbs intended for the Citadel ramparts.

The revised estimate provided cost figures for four different types of curbs and platforms for the body of the work as well as a note that the curbs and platforms of all three ravelins were to be of the same design. Calder amended item 15, the item for segmental curbs and pivots (Fig. 19), to indicate there would be five curbs built on this type at a unit cost of £59.17.6. Undoubtedly, these were intended to be laid at the five salients of the fort, with an ordinary or common traversing platform mounting an 8-inch gun at each. The CRE entered no figures beside items 16 and 17 (those providing for circular curbs for traversing platforms and ground platforms for garrison carriages). But he added three new entries (items 18, 19 and 20) that matched perfectly with the number and types of guns outlined in the approved armament proposal. Item 18 provided for 19 curbs for dwarf traversing platforms at a cost of £30.0.0 each. The armament proposal had described the platforms for the 19, 32-pounder guns (9 ft, 6 in.) on the faces of work as block traversing platforms. Calder's provision for 19 dwarf traversing platforms represents either a further refinement on the original proposal or a simple substitution of a more common designation for one that was less well known. The latter explanation seems more likely as the term 'block' quite possibly refers to the arrangement of the carriage on the platform. Item 19 provided for 12 wooden ground platforms at a cost of £12.0.0 each. These were to be kept in reserve for the pieces (eight 8-inch howitzers, two long 32-pounder guns and two short 32-pounders) which were to be mounted in the event of a siege. Although Calder did not describe them as being of Lieutenant-Colonel Alderson's pattern (Fig. 22) that was undoubtedly the design he had in mind as he had mentioned the Alderson patterns in the armament proposal. More importantly, the CRE ordered the Alderson patterns in the spring of 1847.[23] The final item added to the revised estimate provided for 12 wooden mortar platforms at £6.0.0 each. For the reasons outlined above, these platforms were likely also of Lieutenant-Colonel Alderson's pattern for mortars (Fig. 23). Like the wooden platforms for the howitzers and 32-pounders, the mortar platforms were of simple design and capable of being laid rapidly when needed. The decision to use wooden platforms for the mortars, howitzers and four of the 32-pounder guns, if and when needed, determined that there would be no stone-ground platforms on the Citadel ramparts. In fact, all of the pieces to be mounted on the body of the work would be on traversing platforms, five on common traversing and 19 on dwarf traversing. The remaining ordnance and their wooden-ground platforms were to be stored and mounted only in the event of a siege. The final aspect of the revised estimate is that once again there was no provision for platforms, curbs or pivots for the short 24-pounder guns slated to go in the 20 defence casemates.

In the spring of 1847 the Ordnance staff in Halifax submitted an order for the platforms and carriages for the Citadel armament. There later emerged some confusion over the order for the 24 siege gun platforms of Lieutenant-Colonel Alderson's patterns (one type for the 10-inch mortars, another type for the 13-inch mortars and a third type for the eight howitzers and four of the 32-pounders). Two years after the order had been submitted to the Royal Carriage Department at Woolwich, the department stated that the platforms might not be their responsibility.[24] The Board of Ordnance ultimately concurred and the new CRE in Nova Scotia, Lieutenant-Colonel H.J. Savage, promised to include them in the Ordnance annual estimate for 1850-51.[25] The delay mattered little in any case as the engineering staff in Halifax were now preoccupied with waterproofing the casemates. Until that problem was resolved the armament could not be mounted on the ramparts of the body of the work. Consequently, the question of mounting the approved armament remained in the background for several years.

The Director-General of Artillery at last raised the question again in March 1851. He requested the CRA, Lieutenant-Colonel Willis, to report on the Citadel "with respect to its state of preparation for mounting the Ordnance."[26] Willis forwarded the request to Lieutenant-Colonel Savage for his opinion.[27] The CRE replied that the Citadel would not be able to mount its armament until the summer of 1853.[28] Although the approved ordnance could not be mounted, someone did take the initiative to mount a temporary, but woefully inadequate armament. As of March 1852 there were three 12-pounder guns on iron carriages mounted somewhere in the fort. Two of the guns were condemned and the carriages were considered unserviceable. Nonetheless, the Citadel's first armament had been mounted.[29]

In January 1853 a new CRA, Lieutenant-Colonel Fraser, asked Savage when the approved ordnance might be mounted.[30] Savage informed him that all of the guns for the ravelins, the cavalier, the defence casemates and for the salients of the body of the work could be put in place. The remaining pieces of the permanent armament, the 19 long 32-pounders for the ramparts, would have to wait until 1854, due to the continuing efforts to staunch the leakage in the casemates. Some of the ordnance was likely mounted in the summer of 1853 and work continued on making the ramparts ready for the rest of the guns.[31] The remaining pieces of the permanent armament were installed in either 1854 or the summer of 1855. By September 1855 all of those pieces were mounted, plus an additional one that had not been mentioned in the 1846 proposal, a 12-pounder signal gun.[32]

The Citadel (1855-56)

Even with all of the pieces of its permanent armament finally mounted, the Citadel was not fully prepared to withstand a lengthy siege. No one had greater doubts about the Citadel's defensibility than the General Officer Commanding (GOC), Major-General Sir John Gaspard LeMarchant. In July 1855, shortly after assuming command, LeMarchant reported to the Secretary of State for War his general disappointment with the condition of the Halifax defences, including the Citadel.[33] Three months later LeMarchant submitted a long list of questions on the defensive capability of the Citadel to the CRE, Lieutenant Colonel R.J. Stotherd.[34] Stotherd's answers did little to set the GOC's mind at rest. LeMarchant's persistent criticisms of the Citadel, and the rest of the defence complex, prompted the IGF, Major-General J.F. Burgoyne, to propose that the state of the Halifax defences be investigated by a committee of experts. The idea was accepted and a commission composed of the CRA and CRE in Nova Scotia, the CRE in Bermuda, a naval officer and an officer appointed by the GOC (LeMarchant chose his son) was appointed.[35] The report of the committee's investigations in the spring of 1856[36] and Stotherd's lengthy letter to LeMarchant in November 1855[37] provide us with a good idea of the condition of the Citadel in 1855-56.

There was general agreement that the most serious weakness in the Citadel's defence was its unfinished glacis.[38] It was felt that the many dips and hollows in the glacis on all sides of the fort would have provided excellent cover to an advancing enemy. On the east front the City of Halifax had recently lowered Barrack Street (Brunswick Street) by 15 feet, thereby creating a high bank which would afford "cover to a large body of men at the average distance of 125 yards from the crest of the glacis."[39] Moreover, the steepness of the glacis slope in sections was so great that some of the guns on the ramparts, such as the 8-inch gun at the redan salient, could not be depressed sufficiently to command the terrain in front of them.[40] While there was little that could be done about the grade of the hill, it was recommended that all the hollows be filled in and hillocks levelled to reduce the amount of cover that would be available to enemy riflement, infantry and sappers. Some work was subsequently done on the slopes of Citadel Hill, but never enough to give the fort a perfectly formed glacis.

Another aspect of the fort upon which there was concensus was the weakness of the west curtain. All agreed that it was in a "rotten" state and would not long withstand artillery fire. While that troubled the GOC, the CRE contended that that defect was not overly significant because breaching batteries would have to be established on the crest of the glacis before they could see the curtain.[41] Stotherd believed that it was more important to complete the glacis than to consider rebuilding the curtain.

Another complaint of the GOC was that sections of masonry escarp on the north and east fronts of the Citadel were dangerously exposed to enemy gun fire. Stotherd replied that only the top 2 1/2-3 feet of masonry on the faces of the north front were exposed. In his opinion that was insignificant given that the nearest point an enemy battery could be established on that front was 1500 yards away.[42] On the east front the situation was somewhat more serious, although the CRE and the 1856 committee still saw little need for concern. Nearly one-third of the granite escarp of the salient and faces of the redan were completely exposed. The committee of experts acknowledged that an enemy ship "could bring down the parapets, and the upper 12 or 14 feet of the Escarp," but they felt that since the wall was 42 feet high in that section, that would not constitute a "practicable" breach in the walls. They suggested that an embankment be constructed above the counterscarp which would reduce the amount of escarp exposed to about five feet.[43] One can probably safely assume that their proposal had the support of the officers living in the redan casemates. The project, however, was not carried out.

The 1856 committee was much more concerned about the amount of masonry exposed on the ramparts than it was about exposed courses of escarp. To reduce the possibility of injury or death to gun crews from flying fragments of masonry, they recommended that wherever possible revetments should be of sod rather than brick or granite. Consequently they defended the use of sod revetments for embrasures, parapets, banquettes and traverses on the ramparts of the body of the work.[44] They proposed that the granite and brick revetments of the parapets and embrasures on the north and south ravelins be replaced with sod.[45] This alteration was scheduled to take place in 1856 or 1857. The committee agreed with LeMarchant that the masonry dwarf wall on the ramparts of the body of the work was similarly "objectionable" but they asserted that the parapet was so high that it was not likely to be struck by direct fire, only by ricochet or enfilading fire. While the officers agreed that a fence of wrought-iron posts and rails would have been preferable, because of the reduced possibility of injury from flying splinters of stone and because of the increased space (about 1 ft, 6 in.) it would give on the terreplein, they did not recommend that the dwarf wall be replaced.[46]

Not all of LeMarchant's questions about the defensibility of the Citadel pertained to structural defects. He raised many issues relating to the logistics of withstanding a siege. The answers given by the CRE and the 1856 committee reveal a great deal about both the military's preparedness for an attack and what they would have done if one had materialized.

Lieutenant-Colonel Stotherd felt that the engineering department would need only one week to put those aspects to the fort which came under its purview in a "respectable state of defence."[47] The CRA could not be so optimistic. In 1856 there was still no provision of shot, shells or ammunition in the Citadel, although they had been ordered in August 1853. There was a supply of small stores (linstock, priming wires and other small articles), but only enough for seven 32-pounder guns. The remaining stores were in storage in the depot in the Ordnance Yard.[48]

The 1856 committee estimated that for the Citadel to withstand a six-week siege it would require a garrison of 1360 men. That total was broken down as follows: 900 infantry ("allowing one Infantryman for every two feet of banquette"), 340 artillerymen and 120 sappers.[49] The general rule to be followed in garrisoning a fort for a lengthy siege was to have three times the number of men as would be needed initially. The additional men would be necessary to relieve the weary and replace the injured.[50] Presumably, the committee had followed that line of reasoning in arriving at the figure of 1360. It was a major logistical problem to house and feed that many men within the confines of the Citadel for a six-week period. Stotherd envisioned setting up makeshift accommodation in the musketry gallery, the demi-casemates and in full casemates, with hammocks. He assumed that one-third of the men would always be on duty.[51] The committee estimated that 15,000 cubic feet of storage space, the equivalent of two full-sized casemates and one of the smaller casemates, would be required to store all of the necessary foodstuffs. Additional casemates would be needed for ordnance, engineering and commissariat stores. As for water, 84,000 gallons were thought to be sufficient.[52] The Citadel had more than enough water to meet those needs in its three tanks and two wells. In 1855 the water in the small tanks (containing 30,000 gallons) had been pronounced potable and the two large tanks (each containing 66,000 gallons) were being cleaned of mud and sand and were expected to be ready for use soon. The well in casemate 49 was currently inaccessible as floorboards covered it, but it could be used if needed. There was a certain reluctance to use water from the well in casemate 18 because in February 1851 the remains of a sergeant who had been missing since the night of a fire in December 1850 was found in the well.[53]

The question of the Citadel's ordnance was also discussed by the 1856 Committee. LeMarchant believed that the approved armament could be improved in several respects. First, he thought that heavier pieces than 8-inch guns should be mounted at the salient angles of the southwest demi-bastion and the southeast salient. In that way the fort could make a greater contribution to the defence of the harbour. Second, the GOC wondered whether more mortars, particularly 13-inch mortars, might not be desirable. Finally, he asked whether there would be any provision for hot shot furnaces in the Citadel, there being none in store at present. On the first point the Committee agreed that heavier ordnance should be substituted for the 8-inch guns on the south front. They recommended mounting two 68-pounder guns (95 cwt) on traversing platforms as "more efficient for reaching and disabling shipping at very distant ranges."[54] That recommendation was certainly not surprising. The 68-pounder was the most powerful smooth bore in the service; "it gives the longest ranges, throws the heaviest projectile, and is generally the most accurate in its fire, consequently it is mounted in salient angles of important works."[55] The only surprise is that someone at an earlier date had not suggested mounting 68-pounders instead of the 8-inch guns, particularly on the seaward face of the Citadel. With respect to mortars the 1856 committee concluded that six 4 2/5-inch Coehorn mortars should be added to the reserve armament of the Citadel. They "would be found very useful during a siege."[56] This was a slightly unusual recommendation. Admittedly, Coehorn mortars, being brass pieces, were very light (3/4 cwt) and could be quickly mounted in the event of an attack. By the same token, however, their contribution to the defence of the Citadel would be extremely limited. The range of the Coehorn mortar was about one-half that of the 8-inch mortar and nearly one-third that of the 13-inch mortar.[57] Finally, the 1856 committee urged that two Addison's shot furnaces be included in the Citadel's armament stores.[58] It is unknown whether this last recommendation was acted upon; certainly, the other two (concerning the 68-pounders and the Coehorn mortars) were not.

Subsequent Armament Suggestions for the Citadel

Four years after the committee investigating the condition of the Citadel submitted its report, another proposal was made to update the fort's smooth bore armament. In August 1860 a new CRE, Colonel Nelson, and a new CRA, Colonel Benn, forwarded their suggestions on ways to improve the defensibility of the Halifax defences. For the Citadel they proposed three changes.[59] First, they recommended that the short 24-pounder guns in the 20 defence casemates be replaced by 8-inch guns (8 ft long; 52 cwt) of a shorter and lighter type than those mounted at the salient angles of the body of the work. Although the gun they proposed was highly regarded as a piece for flank defence,[60] it is difficult to understand why they wanted to substitute it for the short 24-pounder. The distance to be covered in the Citadel ditch was so short it would have mattered little, certainly to the attacking forces, whether the anti-personnel projectiles were fired from an 8-inch gun or a 24-pounder. Nelson's and Benn's second proposal was to replace the four 32-pounders in the reserve armament with the same type of 8-inch guns (52 cwt). While the range of the 8-inch gun (52 cwt) was slightly less than that of the long 32-pounder, it was probably considered preferable in the event of a siege because of its superior ability to fire bursting shells at an advancing enemy. The 32-pounder could also fire shells but was normally used to fire round shot. The final proposal made by the CRE and CRA concerned the desirability of storing ammunition in closer proximity to the guns. They recommended that five new, small magazines be constructed in the Citadel, two splinter proof magazines and three expense magazines. The former were to be built on the ramparts of the north and south fronts and the latter in the ditch close to each of the ravelins.

The suggestions put forth by the CRE and CRA in August 1860 were rejected by the higher authorities in Great Britain,[61] although the proposal for two small magazines on the ramparts was later accepted when expense magazines were constructed during the mid-1860s. With one exception London considered the Citadel's armament satisfactory, at least for the moment. That exception concerned the 34 traversing platforms in use at the Citadel and the way in which they were mounted. The evidence is quite sketchy on this subject but it appears that the trucks of the Citadel's traversing platforms did not sit on iron racers embedded in granite, but on all-granite curbs. It was the only fortification in Halifax with that arrangement and the only other battery under the jurisdiction of the CRE with all granite curbs was in Saint John, New Brunswick.[62] Apparently sometime in late 1859 or early 1860 a decision was made in Britain to provide iron racers for all 34 of the Citadel's traversing platforms, regardless of whether they were iron or wooden, common or dwarf. Accordingly, £343 was entered in the estimates for 1860-61 to provide the desired racers.[63] They were not to be of the older, flat iron rail type but rather were known as "raised racers." This latter type was developed during the latter half of the 1850s and possessed a raised convex surface. These "raised racers" were to be used with, in fact could only be used with, a new pattern platform that had concave or hollowed-out trucks and no pivot. The reasons behind the adoption of this new system were explained by Major Miller in his extremely useful compilation Equipment of Artillery (1864).

> The pivot being subject to a sudden and violent strain every time the gun recoils, and being apt to get loose and unserviceable in consequence of the shocks, the late Colonel Colquhoun, R.A., invented a method of dispensing with its use, and his plan has been recently adopted. By this new construction the racers, instead of being flat, have a raised convex surface, and the platform trucks are hollowed out so as to fit upon them; the shock is thus divided among four points instead of being concentrated at one, and is also distributed over the racers, instead of acting on top of the pivot. The racers are still curved round a fixed centre which is called the "imaginary pivot", and may be at various points. The racers in existing works are ordered to be altered to this improved form when found to require it.[64]

The Citadel was one of those fortifications where the War Office thought the system of raised racers and imaginary pivot should be installed. However, the CRE in Nova Scotia, Colonel Nelson, questioned the wisdom of converting existing traversing platforms to the new system. Nelson felt that it was simply "not worthwhile to make the required alterations." The CRE had no objections to installing raised racers and using the imaginary pivot system in new works, but he did not think it was worth the expense to change existing works. He estimated that it would cost £1482 (£78 per platform) to convert the 19 dwarf traversing platforms in the Citadel to the new system.[65] He gave no figures for the conversion of the 15 common traversing platforms mounted in the Citadel. Notwithstanding Colonel Nelson's reluctance on the matter, the decision to install the new type of racers was not changed. In April 1861 Nelson wrote to the IGF notifying him that only five sets of racers had been received in Halifax and that another 29 sets were still required.[66] Archaeological evidence confirms that most of the granite racers were not converted to the new system of raised racers and imaginary pivots.

While the CRE was corresponding with the IGF about traversing platforms, the question of the suitability of the guns mounted at the Citadel arose once more. Here again the extant evidence is very thin, but it is known that on 12 January 1861 the IGF forwarded suggestions to Colonel Nelson regarding an "increased armament" for the citadel and that the CRE promised to forward a report by himself and the CRA on the topic.[67] Neither the IGF's letter nor the joint report seem to have survived. All that remains is a brief outline by Nelson on what ordnance changes he and the CRA would discuss in their forthcoming report. The CRE stated that nine new guns could be used effectively at the Citadel, four new pieces on the three ravelins and five pieces on the ramparts of the body of the work. Of the five for the ramparts, Nelson proposed mounting one on the south front, one in the northwest demi-bastion and three on the east front.[68] In a subsequent letter the CRE specified that he envisioned mounting the nine new guns on granite ground platforms, with "frost proof foundations to correspond with those already built." and that nine new embrasures would be cut for the pieces. He placed the cost of cutting the embrasures and building the platforms at £1244.[69] Neither the type nor calibre of the proposed ordnance was mentioned. Although the evidence is not conclusive, apparently London did not approve the CRA's and CRE's proposal. In fact, it would be surprising if it did. Given the accepted superiority of guns on traversing platforms over pieces mounted on standing carriages and ground platforms, it was quite unusual for Colonel Nelson, and presumably the CRA, to even consider installing additional granite ground platforms in the Citadel, particularly on the ramparts of the body of the work where all of the pieces were on either common traversing or dwarf traversing platforms. Moreover, granite platforms (estimated to weigh slightly more than 60 tons) weighed approximately twice as much as traversing platforms[70] and would likely have placed unwanted extra pressure on the arches of the leaking casemates beneath the ramparts.

After the Trent affair in November 1861, the attention of the military authorities focused for the most part on the harbour defences, not the Citadel. The crisis prompted the British to order the first supply of rifled ordnance for the Halifax defences, ten 100-pounder (subsequently known as 110-pounder and 7-inch) Armstrong guns, as well as a number of heavy smooth bores. Since the rearmament of the sea batteries was considered the top priority none of the new pieces were appropriated to the Citadel. Slightly more than a year after the Trent affair, the GOC, Major-General Doyle, forwarded to the War Office a comprehensive report on the fortifications in which he recommended a major revision of the Citadel's ordnance, including the addition of a number of rifled guns. (See Citadel-Rifled Ordnance for Doyle's recommendations and subsequent proposals for rearming the Citadel.)

Armament: Mounted and Reserve (1855-56)

There were 71 guns mounted in the Citadel in 1855, 5, 8-inch guns, 45, 32-pounders, 20, 24-pounders and 1, 12-pounder.[71] At least 24 of them were located on the ramparts of the body of the fort (5, 8-inch and 19 of the 32-pounders). A 25th, the 12-pounder signal gun, was probably also mounted on the ramparts but there exists a possibility that it was situated on the glacis on the east front, where the saluting battery was established sometime in the 1860s. The 24-pounders were mounted in the defence casemates. Seven 32-pounders were mounted on the cavalier and the remaining 19, 32-pounders were on the ravelins: seven each on the north and south ravelins and five on the west ravelin.

In addition to the mounted armament there were six 8-inch howitzers, two 13-inch mortars and eight 8-inch mortars stored in the Ordnance Yard in 1855.[72] The CRE reported that the platforms for all of those pieces "are prepared and can be laid down when required." The remaining eight pieces of the reserve armament, four 32-pounders, two 8-inch mortars and two 8-inch howitzers, had arrived by May 1856 and were similarly stored in the Ordnance Yard.[73] Sometime before November 1861 the reserve armament was transferred to the Citadel where it was kept on skids so that it could be moved quickly into position if needed.[74]

There was considerable variety in the types of platforms used in the Citadel.[75] The 24-pounder guns in the defence casemates were mounted on wooden-ground platforms. The short 32-pounders mounted on the faces of the ravelins were on stone-ground platforms. The long 32-pounders at the salient angles of the ravelins and on the Cavalier were mounted on iron common traversing platforms. The 8-inch guns were mounted on wooden common traversing platforms. Of the 19, 32-pounders on the ramparts of the body of the work, 13 were mounted on iron dwarf traversing platforms and 6 on wooden dwarf traversing platforms. As wooden platforms were preferred on those fronts most likely to be attacked,[76] it seems probable that all six of the wooden dwarf traversing platforms were located on the west front, perhaps for three of the four 32-pounders mounted in the southwest demi-bastion and for three of the four 32-pounders mounted in the northwest demi-bastion. The 20 wooden-ground platforms for the reserve armament were of three different sizes; one type for the howitzers and guns, another for the 8-inch mortar and yet another for the 13-inch mortar.

As there are very few extant photographs showing the Citadel's smooth-bore ordnance mounted on the ramparts, contemporary plans provide the best guide to the actual location of mounted pieces and the intended location for the pieces kept in reserve. The most useful plan[77] is the one accompanying the May 1856 report on the state of the Citadel and the harbour defences (Fig. 27). The location of mounted ordnance is shown in Fig. 28 and the proposed locations for the pieces in the reserve ordnance in Fig. 29.

Table 16. Ordnance Mounted in Citadel (1856)[123]

	Guns				Carriages	Platforms
	8-in. (9'0")	32-pr (9'6")	32-pr (6'6")	24-pr (6'0")		
Northwest Demi-Bastion						
Right face		2			one wooden sliding* one iron, with trucks*	dwarf traversing (one wooden; one iron)*
Salient	1				wooden sliding*	common traversing (wooden)
Left face		2			wooden sliding*	dwarf traversing (both wooden)*
Flank	(no pieces mounted)					
Curtain Wall	(no pieces mounted)					
Southwest Demi-Bastion						
Flank	(no pieces mounted)					
Right face		2			wooden sliding*	dwarf traversing (both wooden)*
Salient	1				wooden sliding*	common traversing (wooden)
Left face		2			one sliding wooden one iron, with trucks*	dwarf traversing (one wooden; one iron)*
Southeast Salient						
Right face		1			iron, with trucks*	dwarf traversing (iron)*
Salient	1				wooden sliding*	common traversing (wooden)
Left face		2			iron, with trucks*	dwarf traversing (iron)*
Redan						
Right face		2			iron, with trucks*	dwarf traversing (iron)*
Salient	1				wooden sliding*	common traversing (wooden)
Left face		2			iron, with trucks*	dwarf traversing (iron)*
Northeast Salient						
Right face		2			iron, with trucks*	dwarf traversing (iron)*
Salient	1				wooden sliding*	common traversing (wooden)
Left face		2			iron, with trucks*	dwarf traversing (iron)*
Defence Casemates				20	standing garrison* or rear chock	wooden ground
Cavalier		7			iron, with trucks*	common traversing (iron)
North Ravelin						
Right face			3		standing garrison (wooden)	granite ground
Salient		1			iron, with trucks	common traversing (iron)
Left face			3		standing garrison (wooden)	granite ground
West Ravelin						
Right face			2		standing garrison (wooden)	granite ground
Salient		1			iron, with trucks	common traversing (iron)
Left face			2		standing garrison (wooden)	granite ground
South Ravelin						
Right face			3		standing garrison (wooden)	granite ground
Salient		1			iron, with trucks	common traversing (iron)
Left face			3		standing garrison (wooden)	granite ground
Total	5	29	16	20		

Note: There was also one 12-pounder signal gun mounted in the Citadel. Its location is unknown, but it was probably situated in either the southeast salient or southwest demi-bastion. It would likely have been mounted on an iron standing garrison carriage on a wooden-ground platform.

*** The probable nature of the carriage or platform in question.**

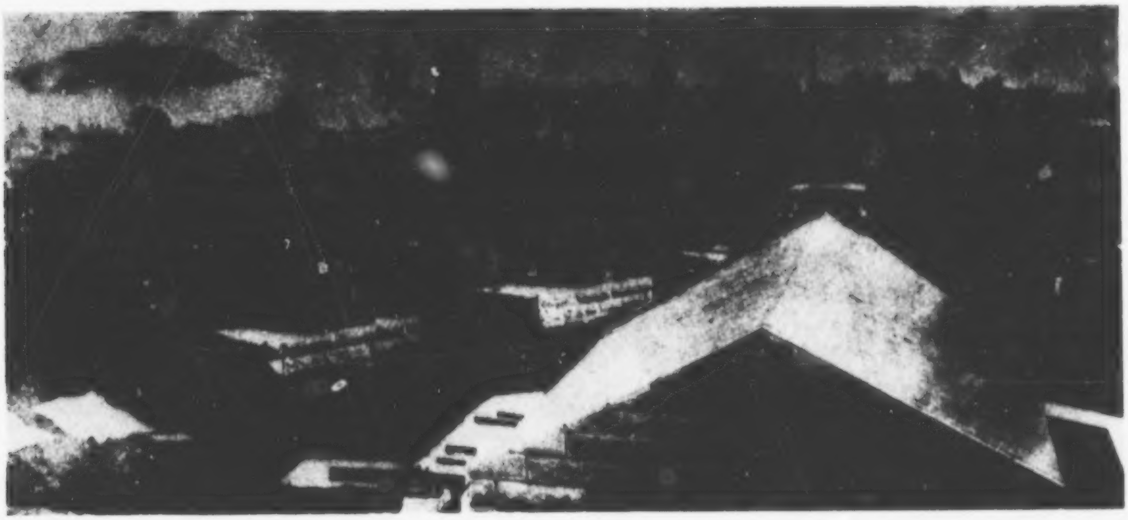


Figure 26. South ravelin (late 1850s-1860s). Four of the south ravelin's seven smooth-bore guns are visible in this photograph: at the salient was a 32-pounder gun (9 ft, 6 in.) mounted on an iron common traversing platform, while above each of the two faces there were shorter 32-pounders (6 ft, 6 in.) mounted on wooden garrison carriages. The arrangement at the north ravelin was exactly the same. (*Public Archives of Canada, C-25755.*)

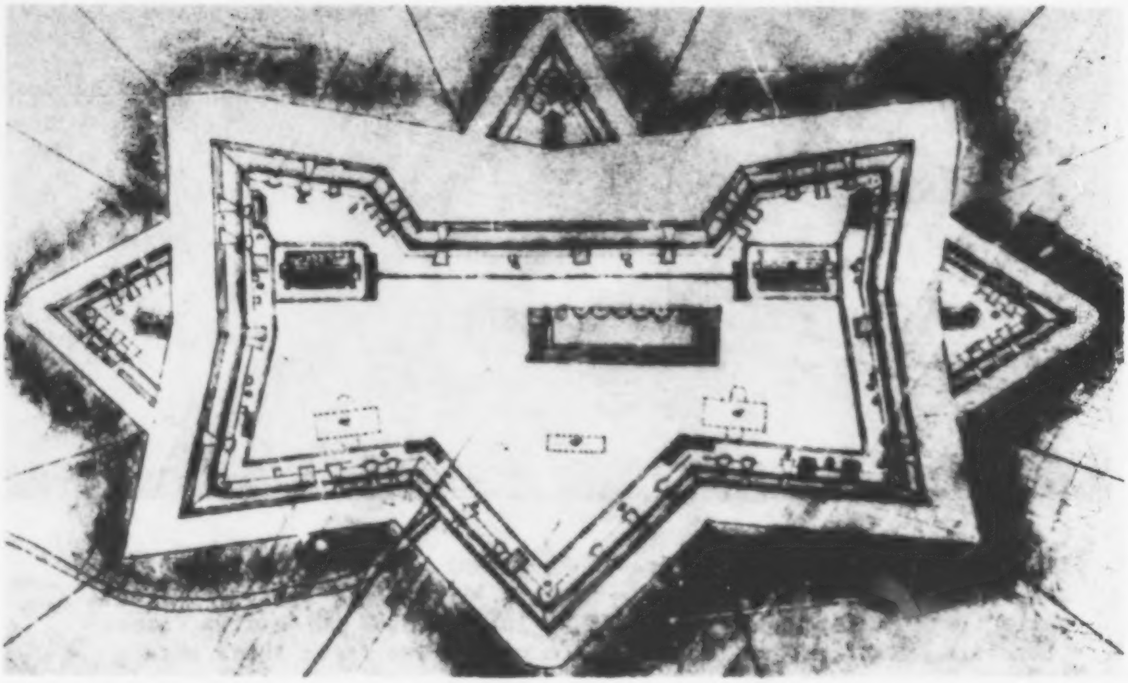


Figure 27. Citadel ramparts (1856). This plan accompanied the 1856 report of the commissioners on the state of the Citadel and the harbour defences. It illustrates both the locations of mounted ordnance and the proposed locations for the reserve armament that would be mounted in the event of attack (a, mortars; b, howitzers; c, guns). (*Public Archives of Canada.*)

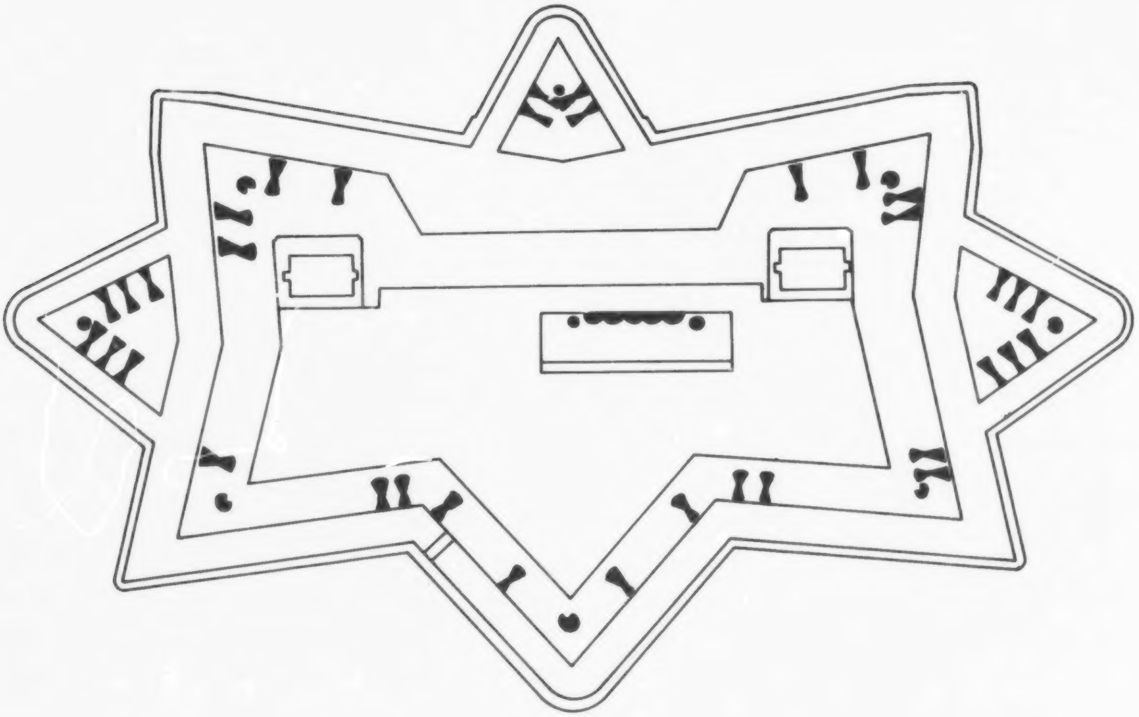


Figure 28. Mounted ordnance (1856). This drawing identifies the location of all the pieces of ordnance mounted on the cavalier, ravelins and ramparts of the Citadel during the 1850s and 1860s. In addition to the guns in these locations, there were 20, 24-pounders mounted in the defence casemates beneath the ramparts.

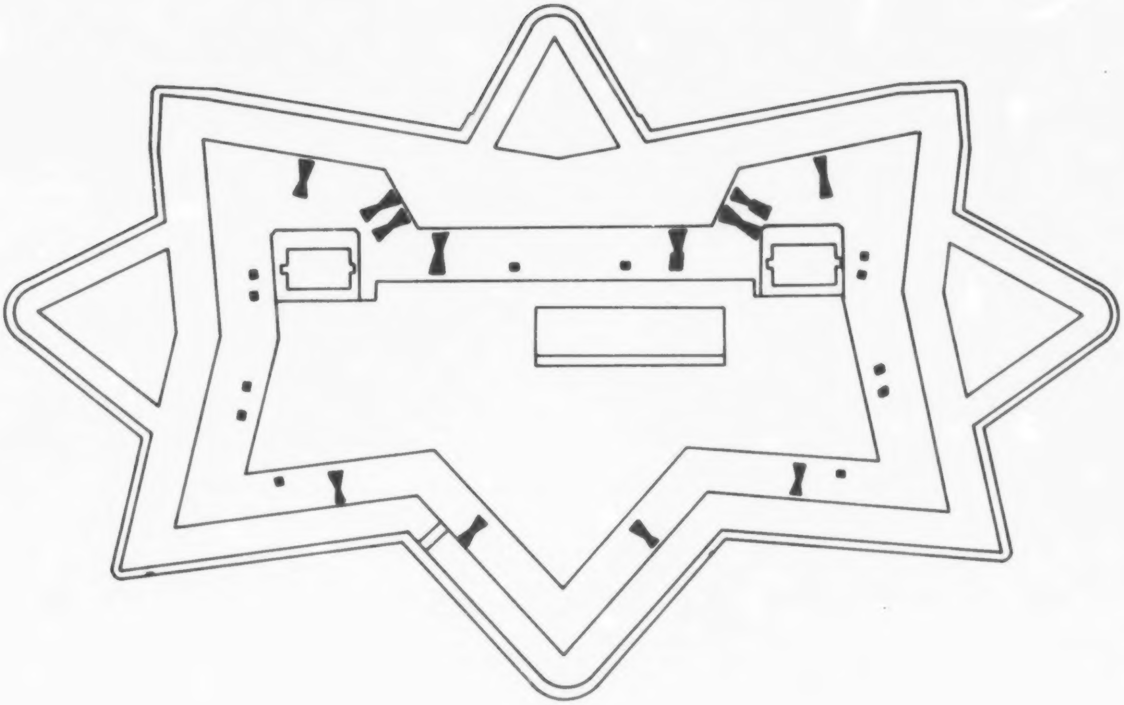


Figure 29. Locations for reserve ordnance (1856). This drawing shows the locations where the 24 pieces in the reserve ordnance would be mounted in the event that the Citadel was ever attacked. The reserve ordnance consisted of 12 mortars, 8 howitzers and 4 guns, all of which were stored in the Citadel by 1856 (along with their platforms and in the case of the mortars, mortar beds). The embrasures required for the guns and howitzers were not to be cut through the parapet until needed.

Northwest Demi-Bastion

There were five guns mounted in the northwest demi-bastion, all of them on traversing platforms. An 8-inch gun (9 ft; 65 cwt) was mounted at the salient angle and two 32-pounder guns (9 ft, 6 in.; probably 56 cwt) above each of the faces. The 8-inch gun fired en barbette and was mounted on a wooden common traversing platform (Fig. 30). The platform traversed on an approximately three-quarter circle granite curb with

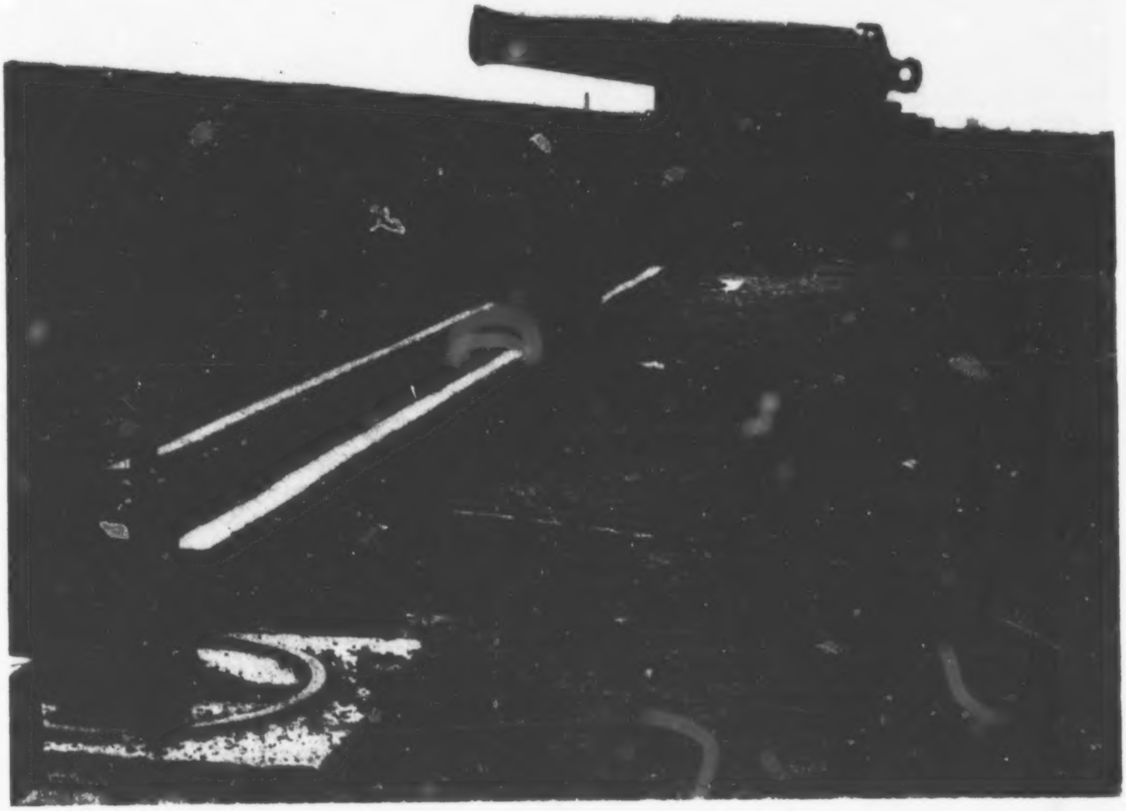


Figure 30. Eight-inch gun on common traversing platform. There was an 8-inch gun mounted on a wooden common traversing platform at each of the 5 salient angles of the body of the Citadel. They were all the same type, Millar Pattern, as is shown in this photograph of an 8-inch gun on a wooden common traversing platform mounted at Fort Henry in Ontario. In the Citadel the curbs upon which the platforms rested were all-granite, with no iron racers as is shown in this photograph. Moreover, the curbs for the Citadel's 8-inch guns were laid in the opposite direction to the ones at Fort Henry. The open end of the semi-circular arc faced the interior of the fort with the pivot placed in an intermediate position. (*St. Lawrence Parks Commission, Old Fort Henry.*)

intermediate pivot.[78] The carriage was likely a wooden sliding carriage.

The 32-pounder guns were mounted on dwarf traversing platforms firing through earthen embrasures, as was proposed in 1846 (Fig. 31). The platforms traversed on front pivots and the trucks appear to have rested on all-granite curbs.[79] The dwarf platforms might have been wooden or iron, as both were used at the Citadel for dwarf traversing platforms. Given that the west front was considered the most likely to

Figure 31. Northwest demi-bastion granite curb and embrasure (ca. 1879). This photograph was probably taken in 1878 or 1879 when work was progressing on the rearmament of the Citadel with rifled ordnance. Visible at the salient angle is a new emplacement constructed for one of the rifled guns appropriated to the fort, in this case for a 64-pounder RML, which was never mounted. To the left of the new emplacement, at the salient angle, are the remains of one of the 19 emplacements where a 32-pounder smooth bore had been mounted on a dwarf traversing platform. The all-granite curb for the platform at that emplacement is not visible due to the rubble, but one of the same type can be seen to the immediate right of the new emplacement. Before the northwest demi-bastion was reconstructed to accommodate a rifled gun, there were 32-pounders mounted on dwarf traversing platforms (with all-granite curbs and firing through embrasures) above both the left and right faces and a single 8-inch gun mounted on a wooden common traversing platform firing *en barbette* at the salient. The two objects standing upright several feet behind the stairwell are mortar beds. (*Public Record Office.*)

be attacked, however, the platforms on the left face and the one closest to the salient on the right face were likely the ones to have been wooden. The carriages would probably have been sliding wooden carriages if they were mounted on wooden platforms and iron carriages with trucks, if they were mounted on iron platforms.

In addition to the five pieces of permanent ordnance, there were another five pieces composing the reserve armament to be mounted only in the event of attack. Two 8-inch mortars (2 ft, 1 in.; 9 cwt) were to be mounted over the right face, two short 32-pounder guns (6 ft, 6 in.; 32 cwt) above the flank and one 8-inch howitzer (4 ft; 21 cwt) on the left face between the two long 32-pounders. All were to have been mounted on wooden-ground platforms, if and when needed. The mortars would require mortar beds (8 cwt 1 qtr 3 lbs) in addition to ground platforms. Embrasures would have to be cut for the guns and the howitzer and they would be mounted on standing garrison carriages, likely wooden.

Curtain

There was no armament on the curtain. The pieces to be mounted in the event of a siege were two 8-inch howitzers (4 ft; 21 cwt), one at either end of the curtain and two 13-inch mortars (3 ft, 3 in.; 36 cwt) in between them. These pieces, their wooden-ground platforms and mortar beds (32 3/4 cwt) were kept in storage, initially in the Ordnance Yard and by 1861 in the Citadel.

Southwest Demi-Bastion

The armament mounted in the southwest demi-bastion was the same as that on the northwest demi-bastion, namely one 8-inch gun (9 ft; 65 cwt) at the salient and two long 32-pounders (9 ft; probably 56 cwt) on each face. The 8-inch gun fired en barbette and was mounted on a wooden common traversing platform with intermediate pivot and three-quarter circle granite curb. The carriage was probably a wooden sliding carriage. The 32-pounders fired through earthen embrasures and were mounted on dwarf traversing platforms with front pivots and all-granite curbs. Although there is no evidence indicating the nature of the platforms, three were probably wooden (two on the right face and the one on the left face closest to the salient) and one iron (the remaining gun on the left face). If that was the arrangement the carriages on the wooden platforms would likely have been wooden sliding carriages, while an iron carriage, with trucks, was probably mounted on the iron platform.

The reserve armament was almost the same as that for the northwest demi-bastion: two 8-inch mortars, one 8-inch howitzer and two 32-pounder guns. The difference was that the 32-pounders for the flank of the southwest demi-bastion were to be longer and heavier (9 ft, 6 in.; 56 cwt) than the ones for the northwest demi-bastion (6 ft, 6 in.; 32 cwt). The CRE and CRA who drafted the 1846 armament proposal explained this variation in terms of the range which could be seen from that flank over the counterscarp north of the west ravelin. Whereas the short

32-pounders of the northwest demi-bastion would have been used exclusively for the defence of the wide ditch on the west front, the long 32-pounders were expected to contribute to the defence of the glacis as well.[80]

Southeast Salient

Four pieces of ordnance were mounted in the south-east salient in 1855-56. Another four were kept in reserve in the Ordnance Yard. An 8-inch gun (9 ft; 65 cwt) firing en barbette was mounted at the salient angle on a wooden common traversing platform with intermediate pivot and a three-quarter circle all-granite curb. The carriage was probably a wooden sliding carriage. On the right face there was a single long 32-pounder gun (9 ft, 6 in.; probably 56 cwt), while on the left face there were two long 32-pounders (9 ft, 6 in.; probably 56 cwt), all three mounted on dwarf traversing platforms (probably iron) firing through earthen embrasures. The dwarf platforms traversed on front pivots with the trucks resting on all-granite curbs. The curb for the gun over the right face is still visible. The carriages for the 32-pounders were probably iron, with trucks.

In the reserve armament for this section of the fort there were two 8-inch mortars for the right face and one 8-inch mortar and one 8-inch howitzer for the left face. The reserve armament, their wooden-ground platforms and mortar beds were kept in storage.

Redan

There were four 32-pounder guns (9 ft, 6 in.; probably 56 cwt) and one 8-inch gun (9 ft; 65 cwt) mounted on the redan. Two 32-pounders firing through earthen embrasures were mounted on dwarf traversing platforms (probably iron) over each face. The carriages were likely iron, with trucks. The trucks appear to have traversed on all-granite curbs; the platforms had front pivots. The 8-inch gun (9 ft; 65 cwt) was mounted at the salient angle on a wooden common traversing platform with intermediate pivot and three-quarter circle granite curb. It fired en barbette and probably was mounted on a wooden sliding carriage.

In both 1855 and 1856 the GOC, Major-General Sir John Gaspard LeMarchant, complained that the 8-inch gun at the salient could not be depressed sufficiently to cover the steep glacis slope on the side of the Citadel, even if the glacis was completed as the CRE was proposing. The 1856 committee investigating the state of the Citadel admitted that weakness but maintained that the 8-inch gun on that front was primarily "intended to command the harbour"; not the glacis.[81] The year before Stotherd had presented much the same argument to LeMarchant. The CRE asserted that all five 8-inch guns were "particularly intended to reach an Enemy at a distance when he first makes his appearance: and to prevent his establishing himself easily within rifle range: - when he has done so and established his Batteries these guns en barbette would be withdrawn and replaced by Howitzers, Mortars and vertical fire."[82]

The reserve armament for the redan was comprised of two 8-inch howitzers. In the event of an attack a wooden ground platform would have been laid on each face, between the 32-pounders, embrasures cut through the parapet and the howitzers mounted on standing garrison carriages.

Northeast Salient

There were five guns mounted in the northeast salient. An 8-inch gun (9 ft; 65 cwt) fired en barbette at the salient angle. It was mounted on a wooden common traversing platform with intermediate pivot and three-quarter circle granite curb. Its carriage was probably a wooden sliding carriage. There were two long 32-pounder guns (9ft, 6 in.; probably 56 cwt) on each face. They were mounted on dwarf traversing platforms, probably iron, firing through earthen embrasures. The carriages were likely iron, with trucks; the platforms traversed on front pivots with the trucks sitting on all-granite curbs.

The reserve armament was made up of one 8-inch howitzer and one 8-inch mortar for the right face and two 8-inch mortars for the left face. The pieces, the wooden ground platforms and the mortar beds were stored in the Ordnance Yard in 1856 but were later moved to the Citadel.

Defence Casemates

Each of the 20 defence casemates had a 24-pounder gun (6 ft; 20 cwt) mounted in it. The guns were mounted on an unspecified type of wooden platform not mentioned in either of the 1846 estimates nor in the armament proposal of the same year. The 24-pounders were probably mounted on either wooden standing garrison carriages or wooden rear chock carriages. The height of the platforms would probably have varied from casemate to casemate as the distance from floor level to gun port does not appear to have been uniform throughout the Citadel. According to contemporary standards the distance from the sill of the gun port to the platform should have been two feet three inches,[83] which would have enabled a gun mounted on a standing or rear chock carriage to fire through an opening with up to five degrees depression for its barrel. In casemate 9, with the floor elevation it had in the 1850s, that would have meant the platform was only several inches high.[84] In casemates 49, 50 and 51, however, the platforms would have had to be more than 10 inches high if their present floors are at approximately the same level as in the 1850s. The wooden platforms would probably have been 12-15 feet long to allow for some recoil when fired and permit gun crews to load and work the guns with relative facility. Although in an 1856 report there is a reference to "gun platforms" in casemate 22 being "fitted for 5 additional men,"[85] the extant remains in casemate 58 clearly indicate there was only one platform that extended across the complete width of the casemate.

The recoil of a 24-pounder gun (6 ft) using full service charge on an unrestrained standing garrison carriage was 9 1/2 feet.[86] There were several ways in which the recoil could have been controlled. The most effective of these was the use of block and tackle attached to both the gun carriage and the ring bolts still visible in the back walls of most of the defence casemates. In addition, the 24-pounders could have been mounted on rear chock carriages (carriages with two trucks only) which would have helped appreciably to slow the rear thrust of the guns after they were fired. Finally, the platforms might have been constructed with a slight incline, as were the ground platforms on the ravelins. However, the use of the platforms in casemate 22 by soldiers would seem to indicate the incline was very slight, if there was one at all.

Cavalier

There were seven long 32-pounder guns (9 ft, 6 in.; probably 56 cwt) mounted on the cavalier, all firing en barbette and all on iron common traversing platforms. The ones at either end were mounted on full circle racers and the five in between were on half-circle racers. The carriages were probably iron, with trucks. In November 1855, a timber roof was being constructed to cover the cavalier terreplein. The CRE reported that the guns would be left in position and "would be available at a very short notice by stripping off the roof." He added that in the event of an attack the timber would be "available for many and useful purposes."[87] The cavalier chimneys had to be raised because of the new roof,[88] thereby adding seven obstacles in the path of the guns.

Doubts had been voiced as early as 1834 concerning the wisdom of attempting to fire guns from the cavalier roof. The fourth CRE on the Citadel project, Lieutenant-Colonel Rice Jones, recommended that a casemate be constructed on each end to give the structure the "additional support it plainly appears to require before it can be safely loaded with its Terreplein, or Guns be mounted on it."[89] Twenty years later, in January 1855, Lieutenant-Colonel R.J. Stotherd reported to the IGF that the walls of the Cavalier were in such bad state "that it is considered doubtful whether the firing of the Heavy Ordnance mounted thereon would not shake the walls very considerably, or possibly bring them down."[90] The GOC in Nova Scotia, Major-General LeMarchant, shared that view. In late 1855 and again in 1856 LeMarchant expressed his concern that the cavalier could not withstand the firing of its own guns.[91] Stotherd, for some reason, seems to have changed his assessment of the cavalier. He admitted to the GOC that the masonry of the front and rear walls was defective but he maintained that "it is not unsafe to work its Seven Gun Battery."[92] The committee investigating the condition of the Citadel in 1856, and of which Stotherd was a member, backed up the CRE with its affirmation, that the Cavalier battery could be "used without intermission" during a six-week siege.[93] Certainly no one attempted to test that hypothesis in 1856. The timber roof and raised chimneys made any firings quite impossible.

North Ravelin

The ordnance mounted on the north ravelin consisted of one long 32-pounder gun (9 ft, 6 in.; probably 56 cwt) and six short 32-pounders (6 ft, 6 in.; 32 cwt). The long 32-pounder fired en barbette and was mounted on an iron common traversing platform which seems to have turned on a full circle granite curb, and central pivot. The carriage was probably iron, with trucks, like the ones shown in photographs of the other two ravelins. The short 32-pounders all fired through brick embrasures. They were mounted on wooden standing garrison carriages on granite-ground platforms. A note on the revised version of the 1846 estimate had specified that curbs and platforms on all the ravelins be constructed on the same designs as those used in the west ravelin. The 1856 record plan indicates that these directions seem to have been carried out (Fig. 27). Stotherd stated in 1855 that the granite platforms on all the ravelins required "some repair."[94] In 1861 another CRE, Colonel Nelson, noted that the guns in the right face would have to be raised six feet before they could cover the glacis.[95]

Stotherd, LeMarchant and the 1856 committee investigating the Citadel agreed that all three ravelins contained somewhat less than the optimum amount of space desired to work the guns. The specified minimum distance between guns in open batteries was 18 feet.[96] Although on the Citadel ravelins it was about 20 feet from gun barrel to gun barrel,[97] due to the shape and location of the banquette slopes, there was not adequate room. "The banquettes have been brought too near the Embrasures to leave sufficient space for the gunners either to work the guns, or to have sufficient shelter from the parapet."[98] Unfortunately, no one could foresee any significant remedy for the problem. The gun crew would have to cope with the hazards of working in a confined, exposed space.

Another criticism of the ravelins was the use of brick revetments for the parapets and embrasures. Stotherd, LeMarchant and the 1856 committee agreed that brick work was "objectionable" in those areas as "splinters therefrom would be very destructive" to the gun crews. The 1856 committee reported that in both the north and south ravelins the brickwork was soon to be replaced by sod revetments,[99] which show up in an 1860 photograph (Fig. 26). No consideration was given to rebuilding the granite embrasures of the west ravelin.

West Ravelin

There were five guns mounted on the west ravelin. The gun at the salient was a long 32-pounder (9 ft, 6 in.; probably 56 cwt) mounted on an iron common traversing platform with full circle granite curb and central pivot. It fired en barbette. The carriage was iron, with trucks (Fig. 25). On each face two short 32-pounders (6 ft, 6 in.; 32 cwt) were mounted on wooden standing garrison carriages. They fired through granite embrasures and were mounted on granite ground platforms (Fig. 24). Two of the platforms and embrasures, one on each face, were removed more than a decade later when the Citadel was renovated for rifled armament. For general comments on the state of the ravelins in 1855-56 see the section on the north ravelin.

South Ravelin

There were seven guns mounted on the south ravelin (Fig. 26). The gun at the salient angle was a long 32-pounder (9 ft, 6 in.; 56 cwt) firing en barbette. It was mounted on an iron standing garrison carriage on an iron common traversing platform with central pivot and full circle granite curb. On each face there were three short 32-pounders (6 ft, 6 in.; 32 cwt) mounted on wooden standing garrison carriages firing through brick embrasures. The brick work on the embrasures and on the parapet were scheduled to be replaced in 1856 or 1857 with sod revetments to reduce the possibility of injury to gun crews. The granite-ground platforms upon which the short 32-pounders were mounted were presumably of the same dimensions as those in the west ravelin, as was directed in 1846.

Signal Gun

A 12-pounder signal gun was definitely mounted in the Citadel by 1855 but there is no evidence as to its location. It might have been mounted in the southwest demi-bastion (where one was located in 1908),[100] in the southeast salient (where one was mounted in 1922)[101] or in the area on the glacis where the saluting battery was subsequently established. Wherever it was located it was probably mounted on an iron garrison carriage and wooden-ground platform. The signal gun may in fact have been one of three 12-pounders that served as the interim armament of the Citadel in the early 1850s.

The signal gun was fired at least twice daily, at 12 P.M. and 8 P.M. Before the establishment of the saluting battery it would probably also have been used to fire certain ceremonial salutes. On at least two occasions in 1857 the evening gun was not fired on schedule: once it was delayed an hour and a half so as not to interfere with a local fireworks display; the other time the gun crew assigned to that duty were 43 minutes late in firing.[102]

Saluting Battery

Although the saluting battery had not been established in 1855-56, it is included in this chapter because its original armament was smooth bores. There were 11 guns, apparently 32-pounders (8 ft; 42 cwt),[103] mounted on wooden standing garrison carriages in the battery. They fired salutes on ceremonial occasions and as naval ships entered the harbour. This would have meant that during the summer months when the harbour was busy with the comings and goings of the Royal Navy there would have been a great many salutes fired from the hill, no doubt to the chagrin of the people living on Brunswick Street.

Although the saluting battery first appears on a plan of the Citadel in April 1871,[104] it certainly existed before that date. In 1868 one of the guns in the battery exploded and two men were killed.[105] Two years later the Town Major, Colonel Ansell, wrote to Edward Jost, the patron of the Jost Mission on Brunswick Street, explaining that the British government would not reimburse him for the damage to the windows of his mission caused by the firing of the guns.

Colonel Ansell noted that since Major-General Doyle (the GOC) had ordered the guns to be pointed in a slightly different direction, there had been no subsequent damage. However, Ansell pointed out, with the approach of spring there would be frequent salutes and "it will be utterly impossible to alter the position of the Guns." The best the army could do was to notify Jost when salutes were likely and he would have to take whatever precautions he thought necessary.[106]

Maintenance of Mounted Ordnance

There were prescribed guidelines for the maintenance of pieces once they were mounted. Given the absence of any evidence to the contrary, it is probably best to assume that the regulations were followed at the Citadel, and elsewhere in the defence complex. To begin with, all pieces of ordnance, carriages, platforms and stores were to be painted at least every two years. Armament mounted where it was exposed to salt spray, as many of the pieces in Halifax were, was to be painted every year. Black paint was used for the pieces and a grey or lead colour for carriages, platforms and stores.[107] Iron traversing platforms, iron carriages and the exterior of iron guns (and presumably iron howitzers, mortars and carronades) were to be protected by an application of what was known as anti-corrosion. It was composed of 44 ounces of anti-corrosion, 4 ounces of Grant's black, 2 ounces of red lead, 1/4 gallon of linseed oil and 1/16 of a pint of spirits of turpentine. These ingredients were to be well-mixed and applied immediately as the solution became useless once it began to harden.[108] For a 32-pounder gun three pounds one ounce of anti-corrosion were required for two coats of the application. Four and three-quarter pounds gave enough for two coats for an iron carriage while 14 1/4 pounds were needed to give an iron traversing platform two coats of the mixture.

The bores and vents of the pieces of ordnance also needed attention. Every two years, or every year if they were exposed to salt spray, a protective lacquer was to be applied to the bore. The lacquer was composed of 36 ounces of Cumberland black lead, one gallon of linseed oil, 10 ounces of red lead and one ounce of lamp black. The ingredients were to be "well ground into the oil, and then boiled slowly till thoroughly incorporated."[109] When not in use guns and howitzers were to be kept depressed, to prevent water from lodging inside. In addition, there were special plugs that could be inserted into the bores and vents. The bores of guns were plugged with "tompions," wood with junk wads attached. For the mortars, there were wooden caps which covered the whole muzzle. The vents could be covered by a variety of different objects. By 1864 specially designed vent plugs, made of india rubber with a leather stud at the end, had been developed. In earlier times the vents had been closed with putty, plugs of gutta percha or pieces of thin cord with a lump of putty at the end. Regular inspections were supposed to determine that the vent and bore were clear. Indeed, iron pieces were to be examined with a mirror after each day's firing. If a vent became overly enlarged by the effects of firing the piece was to be re-vented. Pieces found unfit for further use were to be marked with a cross in two places, one on the face of the muzzle and one under the broad arrow.[110]

The carriages of mounted ordnance were to be shifted occasionally to determine that they could move easily. This applied equally well to standing carriages or carriages on traversing platforms. The shifting also helped prevent the carriage from making an impression on one point of the platform. Similarly, traversing platforms were to be "traversed right or left at least once a week, to ascertain that they work freely and to guard against the racer sinking in consequence of the weight remaining too long at the same point."[111] Finally, elevating screws were to be removed when the pieces were not in use and wooden blocks substituted to keep the barrels depressed.

Equipment for Citadel Ordnance[112]

8-Inch Guns (9 ft)

There were five 8-inch guns mounted on the ramparts of the Citadel, one at each angle of the body of the work. They were mounted on wooden common traversing platforms and fired *en barbette*. The model mounted in the Citadel was known as General Miller's pattern and was the longest and heaviest of five different types of 8-inch guns in service during the first half of the 19th century. Among the five it was considered to be the model most suited to coastal defence. The 1856 Committee investigating the Citadel recommended the 8-inch guns mounted in the southeast salient and southwest demi-bastion be replaced by 68-pounder guns (95 cwt).[113]

The 8-inch gun was designed principally to throw spherical shells up to 3000 yards. There were three different types of shells it could fire: common (46 lbs), fixed shrapnel (containing 339 one-ounce bullets; total weight: 60 lbs, 5 oz) and Martin's (24 lbs, 2 oz). In addition, the 8-inch gun could fire hollowshot, caseshot (with 90 1/2-lb balls), grapeshot (15, 3-lb balls) and carcasses (54 lbs, 5 oz). The regular service charge of ammunition was 10 pounds of large-grained (L.G.) powder; only eight pounds were needed to fire Martin's shells. When the gun was simply being exercised a five-pound charge was used. There was a metal-lined case that held 11 of the 10-pound filled cartridges, 14 of the 8-pound cartridges, 50 of the 2 1/4-pounders and 500 of 60 drams.

To mount or dismount the 8-inch gun, two 16-foot gyns were required. The gun with its carriage was transported on a sling or a platform wagon.

Description	Weight		
	cwts	qtrs	lbs
Gun	65	0	0
Total length: 10 ft, 3 in.			
Length of bore: 8 ft, 9 1/4 in.			
Calibre: 8.05 in.			
Windage: .125 in.			
Width across trunnions: 33 in.			

Sights: fore (dispart), with 2 screws			2 1/4	
hind (brass scale and socket) with 2 screws			2 1/4	
wooden tangent scale			1/4	
Carriages				
Common, standing	15	0	0	
Rear chock	14	0	7	
Sliding, dwarf	14	3	12	
Sliding, casemate	13	3	9	
Iron, with trucks	25	1	10	
Platforms				
Common traversing	25	1	2	
Dwarf traversing	33	3	10	
Casemate traversing	27	0	0	
Ammunition		lbs	oz	
Firing charges - service		10	0	L.G. powder
- Martin's shell		8	0	L.G. powder
- exercise		5	0	L.G. powder
Bursting charges - common shell		2	4	L.G. powder
- shrapnel shell		0	5	(80 drams of M.R. powder)
Projectiles - common shell		46	0	
- fixed shrapnel (containing 339, 1-oz bullets)		60	5	
- Martin's shell (charge, 30 lbs of molten iron)		29	2	
- case shot (90 1/2-lb balls, 11.5 in. long, painted red)		50	4	
- grapeshot (15, 3-lb balls; 9.3-in. long tier pattern)		66	8	
- carcass, filled & fixed (5 lbs of composition)		54	5	
Fuzes - percussion, Pettman's		0	7	
- time, common		0	1 1/5	
- time, shrapnel		0	4/5	
Tubes - common, brass		0	2/5	
- friction, copper		0	1/3	
Bottom, wooden (loose); conical shape		1	2	
Bag, waterproof paper, No. 3 (for shrapnel bursters)		0	1/4	
Cartridges - calico, bursters - common shell		0	1/2	
- calico, bursters - waterproof (No. 8)		0	5/6	
- calico, bursters - shrapnel shell (with common paper bag)		0	1/6	
- flannel, charge - service		0	2	
- flannel, charge - exercise		0	1	
- shrapnel shell (with common paper bag)		0	1/6	
Cover - paper, No. 3 (for service cartridges)		0	1 3/4	
- waterproof (for service cartridges)		0	1 2/7	
Rivet, for bottoms		0	2	

Wads - coal dust	0	0
- grummet (for hollow shot)	0	10
- junk (for Martin's shells)	0	0
- papier-mâché - fuze hole (for common shells)	0	0
- papier-mâché - large landing hole (for shrapnel shells)	3	0
Stores		
Boxes, wooden - 11 1/2 in. x 10 in. x 11 in. - for one shrapnel	10	4
- 20 in. x 10 in. x 11 in. - for two case or shells	16	6
- 20 in.x 10 in.x 13 in.- for two grape	20	12
Case, leather, cartridge (No. 3) - 19 in. deep	5	2
Fid, wood	39	11
Garland, for 30 shells 2 ft. 8 in. square	140	0
Gauges, ring - shot and shrapnel shell, high - 7.95 in. diam.	4	7
- shrapnel shell, low and common shell, high - 7.9 in. diam.	4	6
- common shell, low - 7.82 in. diam.	4	5
- case and grape, low -7.76 in. diam.	4	5
Heads, spare - rammer	3	12
- sponge	5	1
Ladle, copper, with 8 1/2-ft stave	20	15
Pedestals - common carriage	3	2
- sliding carriage	4	6
- casemate carriage	3	5
Punch, for vent (No. 2)	0	2 1/2
Rammer, with 10 1/2-ft stave	10	5
Scraper, shell	0	9
Spike, spring, 10.5 in. long	0	2 1/2
Sponge, with stave and cap	11	10
Stave, spare (10 ft, 6 in.)	6	9
Tompion, with junk wad	9	3
Wadhook, with 9 1/2-ft stave	9	0

32-Pounder Guns (9 ft, 6 in.)

There were 29 long 32-pounders mounted on the Citadel and another two kept in storage in the Ordnance Yard. The armament returns usually describe them simply as 9-ft, 6-in. models, without any reference to their weight. Nineteen were mounted on the ramparts of the body of the work, seven on the cavalier and one at the salient of each of the three ravelins. The ones on the cavalier and the ravelins were mounted on iron common traversing platforms and fired en barbette; the ones on the ramparts were on dwarf traversing platforms and fired through embrasures. Thirteen of the dwarf traversing platforms were iron, six were wood.

Throughout the first half of the 19th century the 32-pounder gun was regarded as one of the most effective pieces of ordnance for long ranges. At 12° elevation its projectiles carried 3030 yards, at 8°, 2335 yards. It was particularly highly rated against ships because of the damage its shot, either hot or cold, could inflict. In addition to round shot, the 32-pounder could fire case shot (with 66 1/2-lb balls), grapeshot (with nine 3-lb balls), common shells, shrapnel (containing 152 musket bullets) and carcasses. The service charge was 10 pounds of L.G. powder. With hot shot only seven pounds eight ounces of powder were used. For exercises and salutes only six pounds of powder were required. The filled cartridges for the 32-pounders were kept in the same size metal-lined case as was used for 8-inch guns.

There was a total of 14 different types of 32-pounders manufactured by the Royal Arsenal during the first half of the 19th century. Two of the types were 9-ft, 6-in. models, one weighing 58 cwt and the other 56 cwt. Possibly both types were mounted in the Citadel, although it seems more likely they were all the 56-cwt piece. The lighter model was the most commonly used piece of ordnance in the British Empire before the introduction of rifled guns.[114] Yet by 1850 the 56-cwt models were no longer being manufactured. The 58-cwt gun, developed in 1847, was one of only four types of 32-pounders still being produced. Nonetheless, two of the 32-pounders in the reserve armament were definitely of 56 cwt[115] and most, if not all, of the 32-pounders mounted elsewhere in the Defence Complex were of the same type, most of which arrived in Halifax in the late 1850s. As there is some doubt surrounding the exact nature of the Citadel's long 32-pounders, descriptions of both pieces are provided. The equipment lists are virtually the same, with the only difference being in the length of the spring spikes.

The 32-pounder of 56 cwt was capable of being transported singly by a sling cart, and with its carriage by the sling wagon or platform wagon. It could be mounted or dismounted by one 16-foot gyn. The 58-cwt model appears to have required two 16-foot gyns.

Description	Weight		
	cwts	qtrs	lbs
Gun (56 cwt)	56	0	0
Total length: 10 ft, 5 in.			
Length of bore: 8 ft, 11 1/4 in.			
Calibre: 6.41 in.			
Windage: .233 in.			
Width across trunnions: 29 in.			
Gun (58 cwt)			
Total length: 10 ft, 7 in.			
Length of bore: 9 ft, 1/2 in.			
Calibre: 6.375 in.			
Windage: .198 in.			
Width across trunnions: 31 3/4 in.			
Sights: exactly the same as for 8-in. guns.			
Carriages			
Common, standing	14	3	0
Sliding, dwarf	14	2	0
Sliding, casemate			
Iron, with trucks	23	2	0
Platforms			
Common traversing	23	0	0
Dwarf traversing	33	3	10

Casemate traversing	27	0	0	
Ammunition		lbs	oz	
Firing charges - with shot or shell		10	0	L.G. powder
- for exercises and salutes		6	0	
- with hot shot		7	8	
Bursting charges - common shell		1	2	L.G. powder
- shrapnel shell		0	3,	50 drams of M.R. powder
Projectiles - solid shot		32	0	
- case shot (66 1/2-lb balls, 11.6 in. long; painted red)		36	4	
- grapeshot (nine 3-lb balls, 8 ft, 7 in. long; tier pattern)		36	4	
- common shell, loose		22	0	
- shrapnel, fixed (containing 152 musket bullets)		28	12	
- carcass, filled and fixed (2 1/2 lb of composition)		26	12	
Fuzes - percussion, Pettman's		0	7	
- time, common		0	1 1/5	
- time, shrapnel		0	4/5	
Tubes - common, brass (requires portfires and slow match)		0	2/5	
- common, copper		0	1/3	
Bottom, wooden (loose); conical		0	10	
Bag, waterproof paper, No. 3 (for shrapnel bursters)		0	1/4	
Cartridges - calico, bursters - common shell		0	2/5	
- common waterproof (No. 7)		0	2/3	
- shrapnel shell (with common paper bag)		0	1/6	
- flannel, charge - service		0	2 1/2	
- exercise		0	2	
Cover - paper, No. 7 (for service cartridges)		0	2	
- waterproof (for service cartridges)		0	1	
Rivets - for bottoms		0	2	
Wads - grummet - used with solid shot		0	7	
- junk - used with red hot shot		1	8	
- papier-mâché - fuze hole (for securing common shells)		0	0	
- loading hole, large (for securing shrapnel shells)		0	0	
Stores				
Boxes, wooden - 28 1/2 in. x 8 in. x 12 in. - for four grape or case		21	1	
- 29 in. x 9 in. x 9 1/2 in. - for four shell		19	0	
Case, leather, cartridge (No. 4) - 16 in. deep		3	6	
Fid, wood		21	5	
Garland, for 30 shot - 2 ft, 1 1/4 in.		94	0	

Gauges, ring - all shot and shells, high - 6.207 in. diameter	3	4
- solid shot and shells, low - 6.147 in. diameter	3	3
- case and grape, low - 6.087 in. diameter	3	2
Heads, spare - rammer	2	0
- sponge	3	12
Ladle, copper, with 8 1/2-ft stave	18	0
Pedestal - standing carriage	3	2
- sliding carriage	4	6
Punch, for vent (No. 4)	0	2
Rammer, with stave	8	14
Scraper, shell	0	6 1/2
Spike, spring, 8.48 in. long (for 58-cwt gun)	0	2
Spike, spring, 8.1 in. long (for 56-cwt gun)	0	2
Sponge, with stave, and cap	10	10
Tompion, with junk wad	4	10
Wadhook, with 9 1/2-ft stave	9	0

32-Pounder Guns (6 ft, 6 in.)

There were 16 short 32-pounder guns mounted in the Citadel, all on the ravelins. Each gun was mounted on a wooden standing garrison carriage and fired through an embrasure. The ground platforms were granite. The normal recoil of the piece was 11 1/2 feet.[116] In addition to the mounted ordnance there were two short 32-pounders kept in storage. They were to be mounted on the flank of the northwest demi-bastion in the event of an attack.

This length of 32-pounder was designed exclusively for flank defences. Its range was 1050 yards at 2° elevation, 2200 yards at 8°. The piece was manufactured by boring a 24-pounder to give it a calibre large enough to take a 32-pound shot. In 1859 there were 177 32-pounders of this type in use throughout the Empire and another 338 in storage.[117] The regular service charge was five pounds of L.G. powder. With hot shot the charge was reduced to 3 pounds 12 ounces and for exercising the guns only 3 pounds of powder was used.

The gun was mounted and dismantled by one 16-foot gyn. It could be transported by itself in the sling cart. With its carriage the sling wagon or platform wagon was used.

The equipment and stores for the short 32-pounder were almost exactly the same as that for the longer and heavier 32-pounders. The list below shows only the differences. For the rest of the equipment see the preceding list for the long 32-pounders.

Description	Weight		
	cwts	qtrs	lbs
Gun	32	0	0
Total length: 7 ft, 6 in.			
Length of bore: 6 ft			
Calibre: 6.3 in.			
Windage: .123 in.			
Width across trunnions: 27 1/2 in.			

Sights: exactly the same as for 8-in. guns			
Carriage			
Common, standing	11¼	0	0
Ammunition		lbs	oz
Service charge - regular		5	
- with hot shot		3	12
Exercising charge		3	0
Stores			
Cartridge case - No. 6			
Side arms have staves 8 ft long			
Spring spike - 7.1 in.			

24-Pounder Guns (6 ft)

There were 20, 24-pounder guns mounted in the Citadel, one in each of the defence casemates. They were mounted on wooden platforms with either common standing or rear chock carriages. Their normal recoil of 9 1/2 feet[118] was checked by block and tackle attached to the carriages and ring bolts in the rear walls of each of the casemates.

The short 24-pounders mounted in the Citadel were the shortest and lightest of five types of 24-pounder guns. They were manufactured by boring a 12-pounder gun of the same length (and weighing 21 cwt). By increasing the calibre of the gun the piece was able to fire a 24-pound shot. In 1859 there were 335 of the short 24-pounders in service throughout the Empire.[119] They were recommended for flank defence, which is how they were used in the Citadel and were often mounted in casemates as substitutes for 24-pounder carronades. At 2° elevation the range of the short 24-pounder was 750 yards, at 8° it was 1750 yards.[120] In the Citadel the 24-pounders were to command the ditch against enemy infantry during the late stages of a siege. As a consequence, their principal projectiles would have been case or grapeshot, the most effective of contemporary anti-personnel devices.

The 24-pounder gun could be mounted or dismounted by one 16-foot gyn and transported by sling cart.

Description	**Weight**			
	cwts	qtrs	lbs	
Gun	20	0	0	
Total length: 6 ft, 9 in.				
Length of bore: 5ft, 6 1/2 in.				
Calibre: 5.823 in.				
Windage: .139 in.				
Sights: same as for 8-in. guns.				
Carriages				
Common, standing	4 1/2	0	0	
Rear chock	8 1/2	0	0	
Sliding, dwarf	4 1/4	0	0	
Ammunition		lbs	oz	
Firing Charge - service and exercise		2 1/2	0	L.G. powder
Bursting charge - common shell		0	13	L.G. powder
- shrapnel		0	2 1/2	M.R. powder

Projectiles - solid shot	24	0
- case shot (46 1/2-lb balls); 10.9 in. long, painted red	25	7
- grapeshot (9, 2-lb balls); 7.6 in. long, tier pattern	26	0
- common shell, loose	16	0
- shrapnel shell, fixed (containing 110 musket bullets)	20	11
- carcass, filled and fixed (1 1/4 lb of combustion)	19	4
Fuzes - percussion Pettman's	0	7
- time - common	0	1 1/5
- shrapnel	0	4/5
Tubes - common, brass	0	2/5
- friction, copper	0	1/3
Bottom, wooden (loose); conical	0	7 1/2
Bag, waterproof paper, No. 2 (for shrapnel bursters)	0	1/6
Cartridges - calico, bursters - common shell	0	1/2
- waterproof (No. 6)	0	1/2
- shrapnel (with common paper bag)	0	1/8
- flannel, charge - service	0	2
- exercise	0	1
Cover - paper, No. 16 (for service cartridges)	0	1 1/4
- waterproof (for service cartridges)	0	1 2/7
Rivet, for bottoms	0	2
Wads - grummet	0	5
- junk	1	2
- papier-mâché - fuze hole	0	0
- loading hole, large	0	0
Stores		
Boxes, wood - 21 in. x 13 in. x 10 1/2 in. - for six grape or case	26	8
- 21 in. x 3 in. x 9 1/2 in. - for six shells	20	12
Case, leather cartridge (No. 6)		
Garland, for 30 shot (1 ft, 11 in. square)	76	0
Gauges, ring - shell, high - 5.62 in. diameter	2	15
- solid shot, low - 5.584 in. diameter	2	14
- shell, low - 5.557 in. diameter	2	13
- case and grape, low - 5.52 in. diameter	2	12
Gauge, for hot shot (with two handles; width: 25 in.)		
Heads, spare - rammer	1	10
- sponge	3	5
Ladle, copper, with 7 1/2-ft stave		
Pedestal, for standing carriage	3	0
Punch, for vent (No. 4)	0	2
Rammer, with 7 1/2-ft stave		
Scraper, shell	0	5 1/2
Spike, spring - 5.95 in. long		

Sponge, with stave and cap	10	3
Stave, spare - 7 1/2-ft		
Tompion, with junk wad	4	3
Wadhook, with 7 1/2-ft stave		

CITADEL - RIFLED ORDNANCE

Proposals to upgrade the Citadel's ordnance surfaced almost as soon as its original armament was mounted. In 1856 the committee investigating the condition of the Citadel recommended that the 8-inch guns (65 cwt) mounted at the two salients on the south front be replaced by two 68-pounders (95 cwt). It was the committee's considered opinion that the heavier smooth bores were "more efficient for reaching the disabling shipping at very distant ranges." In a less important suggestion the committee proposed adding six 4 2/5-inch Coehorn mortars to the reserve armament of the fort.[1] Four years later, in August 1860, the CRE and CRA recommended that 8-inch guns (52 cwt) be substituted for the 24-pounders in the defence casemates and the four 32-pounders in the reserve ordnance.[2] In February 1861 they proposed adding nine guns, of unknown nature but almost certainly smooth bores, to the Citadel's armament.[3] None of these suggestions were approved nor did any of them include provision for mounting rifled ordnance on the fort.

1863-73, Partial Rearmament

The first person to recommend in writing, rifled guns for the Citadel, seems to have been Lieutenant-Colonel Spencer Westmacott, the CRE in Nova Scotia. In January 1863 he forwarded a report on the state of the fortifications to the GOC, Major-General Doyle, in which he proposed mounting a number of rifled pieces in the fortifications of Halifax. Doyle submitted Westmacott's report, together with a covering letter and lists of existing and proposed armament, to the War Office less than a week later.[4] In the covering letter the GOC stated that the Citadel was an "efficient work" but that it required "some long range guns to be mounted on its sea face."[5] In the list of proposed armament attached to the report, Doyle identified the pieces he and Westmacott had in mind for a rearmed Citadel (Table 6). Doyle listed 25 new guns, of which ten were to be 110-pounder rifled Armstrong guns. He advocated retaining only 50 of the 94 pieces currently appropriated to the fort, the five 8-inch guns mounted at the salients and 45, 32-pounders.[6] Clearly, the GOC envisioned much more than a replacement of the pieces on the two seaward faces. He was proposing a major revision of the Citadel's armament.

Doyle's report on the Halifax defences was quickly approved by the War Office,[7] although that approval apparently did not extend to the armament recommendations. Twenty thousand pounds (subsequently reduced to £15,000) was provided in the approved estimates for 1863-64 for the renovation of the key harbour defences.[8] Apparently none of that money was earmarked for the Citadel. In comparison with the reconstruction of Forts Charlotte, Clarence and Ogilvie and the establishment of High Level (later Cambridge) Battery, the rearmament of the Citadel was a low priority. The local officers in Halifax seem to have recognized that fact, for in the CRE's submission for work to be carried out in 1863-64 he proposed mounting only ten guns (a combination of 68-pounder smooth bores and rifled Armstrong guns) not the 25 pieces recommended a few months earlier.[9] By mid-August that figure had shrunk to four, vaguely referred to as rifled guns of the "heaviest long range." The CRE and CRA wished to see the four rifled pieces mounted on the seaward or southeast angle of the fort, replacing an equal number of 32-pounders.[10] It was felt that, while the south battery of Fort Charlotte was being reconstructed, it would be particularly advantageous to have rifled pieces mounted on that face of the Citadel to cover a portion of the water normally commanded by the guns at the south end of George Island.[11] The reasoning was flawless, the problem was a shortage of funds and rifled ordnance.

In the estimate submitted for 1864-65, the CRE inserted £1000 for a partial rearmament of the Citadel and the construction of two expense magazines in new traverses on the ramparts. The item provided for mounting five heavy rifled guns on the seaward face.[12] The item was deleted from the estimates in Great Britain but the GOC was undoubtedly pleased to be informed in June 1864 that a new armament had at last been decided for the Citadel. It was to consist of ten pieces, four 7-inch (formerly 110-pounder) rifled Armstrong guns, one rifled 12-ton gun (later known as a 9-inch RML) and five 68-pounder smooth bore guns. The 12-ton gun had not yet come into service but the intention was to mount it at what was described as the "Eastern Salient." While that description would seem to indicate the salient of the redan, it is not certain. On a number of different plans and reports the geographical designations assigned to the Citadel are obviously confused.[13] The five 68-pounders were "to take the place of the like number of 32-pounders at present mounted on the Eastern face bearing on the harbour."[14] The intended locations for the four Armstrong guns were not listed but were undoubtedly also to be on the seaward front of the Citadel, either on the redan or southeast salient or on the south ravelin. The locations selected for the new ordnance were significant in that they demonstrate how the perceived role of the Citadel was changing during the 1860s. When the construction of a masonry bastioned fort on Citadel Hill was first conceived of in the 1820s, it was thought of principally as a landward defence, guarding against a possible attack from the west. Its contribution to the defence of the harbour was of secondary importance. The limited range of smooth bore ordnance (1500-2000 yards effective range) meant that the guns on the eastern and southeastern fronts of the fort could command only a small portion of the harbour (Fig. 2). The introduction of rifled guns (with approximately twice the effective range of the smooth bores), however drastically altered the Citadel's role. Rifled ordnance placed on the redan, for instance, were capable of firing with accuracy all the way across the harbour to the Dartmouth shore. In spite of the fact that the Citadel continued to be regarded as the chief land defence of Halifax, the persistent emphasis placed on the rearmament of the seaward faces of the work, to the exclusion of the landward positions, reveals that its role as a supporting sea defence had become predominant by the 1860s.

Shortly after Major-General Doyle was informed in July 1864 that ten new guns had been approved for the Citadel, the CRE requested the CRA to have seven guns dismounted "in order to at once commence laying new platforms." The pieces to be removed all faced seaward and were located as follows: at the salient of the redan, to the immediate right of the redan salient, at the southeast salient, to the immediate right of that salient, at the salient of the south ravelin and the two pieces on either side of the above gun.[15] If the platforms in question were for seven of the ten pieces in the recently approved heavy armament for the Citadel, which is probable, given that the locations identified for the new platforms were similar to those allocated for the new guns, it is unlikely that many of the new platforms could have been laid in 1864. The platforms for the 68-pounders probably could have been installed but later armament returns (Table 17) suggest that 68-pounders were never mounted in the Citadel. The 12-ton rifled gun was not even in production yet and as for the 7-inch rifled Armstrong guns, there were only enough platforms in Halifax for the 7-inch guns which were appropriated to other sites. Due to a lack of evidence concerning the work that was carried on at the Citadel in 1864, it is difficult to judge whether or not all seven guns were dismounted as requested and some new platforms installed. In the "Report and Estimate of Works and Repairs proposed to be carried on by the Royal Engineer Department ..." in 1865-66, however, reference was made to continuing the "improvement of armament" of the Citadel.[16] Obviously, something had been done in 1864, most likely the dismounting of some of the guns on the eastern and southern fronts as proposed and perhaps the laying of some new platforms. A comparison between the lists of mounted ordnance for 1863 and 1873 indicates that only five of the seven guns proposed to be dismounted in 1864 were probably removed: those at the salients of the south ravelin, southeast salient, southwest demi-bastion and redan and the one to the immediate right of the redan salient.

In April 1865 a supply of 12, 9-inch and 20, 7-inch RMLs were ordered for the Halifax defences.[17] The Civil War in the United States was virtually over and the British were now worried that the victorious Union forces might attempt to add British North America to their list of conquests. A supply of the heaviest guns then available were accordingly approved to be sent out to Halifax. The Citadel was to receive one of the new pieces, a 9-inch RML. That appropriation confirmed the decision made the year before which allotted one 12-ton gun to the Citadel. While the authorities in Halifax awaited delivery of the RMLs, work on the fortifications continued throughout 1865. Once again there is very little evidence to indicate the nature of the projects undertaken at the Citadel, but it obviously involved changes to the armament on the seaward faces. In mid-September complaints were voiced by the engineering staff about damage being done to the granite steps in the southeast salient by working parties under the direction of the Royal Artillery. The engineers complained that 19 steps had been disfigured by men carrying heavy pieces of gun carriages to the terreplein. The CRE, Lieutenant-Colonel Westmacott, pointed out to the CRA that the ramp on the west front should be used for transporting such heavy equipment, not the steps.[18] It seems likely that the carriages being carried up the steps were for some of the new guns, probably 7-inch Armstrongs and a 9-inch RML, which were approved for the Citadel in 1864. There is only one location for which there is specific

Table 17. Mounted Ordnance - September 1873[59]

				Smooth Bores				
	RML	RBL		Guns		Mortars		
	9-in.	7-in.	8-in.	32-pr	24-pr	13-in.	8-in.	Total
Northwest Demi-Bastion								
Right face				2				2
Salient			1					1
Left face				2				2
Curtain	no ordnance on ramparts							
Southwest Demi-Bastion								
Right face				1				1
Salient		1						1
Left face				1		1	1	3
Southeast Salient								
Right face						1		1
Salient	1							1
Left face				2				2
Redan								
Right face		1		1				2
Salient		1						1
Left face				2				2
Northeast Salient								
Right face				2				2
Salient			1					1
Left face				2				2
Defence Casemates					20			20
Cavalier				5				5
North Ravelin								
Right face				3				3
Salient				1				1
Left face				3				3
West Ravelin								
Right face				2				2
Salient				1				1
Left face				2				2
South Ravelin								
Right face				3				3
Salient		1						1
Left face				3				3
Totals	1	4	2	38	20	2	1	68

evidence of activity being carried on relating to the mounting of a new armament. One month after Westmacott complained about artillery equipment being brought up the steps he wrote to the Military Secretary that preparations were underway "for mounting a new gun at the southeast salient". The signal mast was interferring with the work and the CRE suggested that it could be moved back, closer to the "entering angle of the Terreplein on its right rear." He noted that if the mast was moved it would have to be lengthened about 11 feet so that the "ball yard" would remain at the same elevation.[19] While Westmacott's suggestion seems to have been carried out in late 1865,[20] it is unlikely that a gun was mounted at the salient until 1866 or 1867. At that time a 9-inch RML was probably mounted.

The spring of 1866 witnessed continued armament activity in the Citadel. In late May the CRA requested that a large mound of earth in the southwest demi-bastion be removed. He stated that it was "in the way of moving Guns" and other heavy objects. What guns were being moved is not known precisely, but it seems possible that it included bringing down some of the dismounted smooth bores and carrying up some of the new pieces, via the ramp on the west front, to the south and east fronts where platforms and carriages were carried in 1864 and 1865. The CRE had no objection to moving a small portion of the earthen mound but he opposed the removal of all the earth on the grounds that it "would be specially useful in event of attack." Major-General Doyle agreed with the CRE.[21] About the time this question arose, the GOC was informed that the 32 RMLs ordered in April 1865 would soon be shipped to Halifax. One of the 12, 9-inch pieces was still appropriated to the Citadel.[22] The guns appear to have arrived in late September or early October 1866[23] but there is no record of a 9-inch gun being transported to the Citadel that fall. If it was, which is likely, it was probably mounted in the southeast salient in late 1866 or during the 1867 construction season. Certainly by September 1873 a 9-inch RML was mounted in that location and used for drill purposes.[24]

Neither the "Report and Estimate of Works and Repairs ..." proposed to be carried on in Halifax for 1867-68 nor for 1868-69 indicate any projects, relating to armament or otherwise, to be carried out at the Citadel. All of the money (£35,000 in 1867-68 and £25,000 in 1868-69) was supposed to be expended on the more important harbour defences.[25] Yet it is obvious from the little evidence that exists that work did continue on the Citadel's ordnance during these years. In a letter written by Colonel Ansell, the Town Major, to Major-General Doyle in December 1868 he made reference to a "new armament" being placed on the south ravelin. Ansell informed the GOC that the Royal Artillery were continually passing through the ravelin guardhouse "to keep the Guns and stores in order," thereby rendering the guardhouse "almost uninhabitable" for the Provost Sergeant who lived on the upper floor. The quarters had become so draughty that the Provost Sergeant's wife had moved out to live in the town. Ansell suggested that new quarters might be found elsewhere in the Citadel for the Provost Sergeant.[26] Evidence from both before and after 1868 reveals the probable nature of the guns referred to in the Town Major's letter. It is known that in August 1864 the CRE requested the CRA to have three guns on the south ravelin (the long 32-pounder at the salient and the two short 32-pounders to the immediate right and left) dismounted so that new platforms could be laid.[27] A listing of the Citadel's mounted ordnance in September 1873 (Table 17) shows that at that date a 7-inch Armstrong was mounted at the salient of the ravelin with three 32-pounders mounted above each face. The reference in Ansell's letter seems to indicate that the project of mounting the 7-inch Armstrong (and perhaps two 32-pounders on new platforms) was finished during the summer or fall of 1868. If that hypothesis is correct then it is likely that the rest of the 7-inch Armstrongs mounted on the Citadel (at the salient of the southwest demi-bastion and at the salient and above the right face of the redan) were probably also in place by 1868 and may have been mounted as early as 1864. Probably by the end of 1868 the Citadel's ordnance was the same as that reported in September 1873 (Table 17). Of the 68 pieces mounted in the fort only five were rifled. In comparison with the new forts and batteries being constructed or reconstructed around the harbour, the Citadel was one of the most poorly armed of the defences of Halifax. A new armament was needed to revitalize its role.

As the work on the Halifax fortifications progressed during the mid-1860s the quantity of dismounted ordnance increased appreciably. At last in the spring of 1869 Doyle was directed to deal with the growing numbers of old smooth bores by having them returned to the Military Store Department.[28] In the case of the Citadel it was decided that there were 14 pieces "not likely to be required for defensive purposes," eight 8-inch howitzers and six 32-pounder guns. The howitzers and four of the 32-pounders were undoubtedly part of the reserve armament stored in the fort. Since the other 32-pounders were described as looking as if they had "never been mounted,"[29] it is difficult to know where they came from. They could have been two of the seven guns that were supposed to have been dismounted on the redan, southeast salient and south ravelin in 1864 to make way for the laying of new platforms. If so, it is surprising that there were not more pieces to be turned into stores. In any case, the GOC was informed that approval had been given to expend £40 in 1870 to return the 14 pieces and all their stores to the Military Store Department.[30] In comparison, in 1888 there were two 24-pounder guns at the signal station on Sambro Island that were to be returned to stores only if the expense of removal did "not exceed their value." In the latter case "they should be thrown into the sea."[31]

1873-1900, The Final Armament

In March 1870 the Defence Committee in Great Britain proposed that Halifax be armed with a total of 77 RMLs, 45 more than were already appropriated to the fortifications.[32] Two years later, in July 1872, the War Office requested the GOC to forward recommendations on the total armament, not just RMLs, which he and his staff proposed for Halifax.[33] By January 1873 the guns and their intended locations had been decided (Table 7). The listing indicated that four new calibres of ordnance (40-pounder RBLs, 20-pounder RBLs, 7-inch converted RMLs and 64-pounder converted RMLs) were now identified for the Halifax defences. Ninety pieces in all were appropriated to the Citadel, including the 11 guns in the saluting battery. Forty-eight of the 79 pieces to be within the fort were to be rifled guns; 7, 7-inch RMLs, 9, 7-inch RBLs (Armstrong guns), 12, 20-pounder RBLs and 20, 64-pounder converted RMLs. Excluding the 20-pounder RBLs, which were field guns and presumably intended only to be stored in the fort until an attack on Halifax seemed imminent, there were 36 rifled guns to be mounted on the ramparts of the body of the work and the ravelins. Specific locations were not mentioned. No 8-inch or 32-pounder smooth bore guns were to remain in the fort, with the exception of the 11, 32-pounders in the saluting battery. The only smooth bore pieces for which a military role was still envisioned were the 20, 24-pounders in the defence casemates and 11 mortars. Finally, it was noted that there was a 9-inch RML in the Citadel (the one mounted at the southeast salient), which was not counted as one of the pieces appropriated to the fort but was to remain nonetheless and to be used for drill purposes.[34]

Most of the 90 pieces appropriated to the Citadel were listed as being in Halifax, and perhaps already in the fort. Only the 20-pounder RBLs, the field pieces, were identified as having to be supplied from Great Britain. There was a note concerning the 20, 64-pounder RMLs that they were "to be converted". Given that they were placed under the "to be retained" column, it would seem to indicate that the conversion was to take place in Halifax, although it seems doubtful that Halifax would have had the equipment required to convert a smooth bore to a rifled gun. The process had been developed by a Captain Palliser and it involved boring out the cast-iron barrel of the smooth bore to remove erosion marks. A wrought-iron rifled liner was then inserted which was expanded into place by firing a heavy proof charge. The wrought-iron liner was kept in position by an iron collar and a screw plug under the trunnions.[35] The 64-pounders identified for the Citadel were all to be converted from 32-pounders (58 cwt). While it was also possible to convert 8-inch smooth bores into 64-pounders, this was not to be done with the Citadel's 8-inch pieces.[36]

It is not known whether or not the large shipment of rifled guns that arrived in Halifax in 1873 included any pieces appropriated to the Citadel. If they did arrive it was certainly not a priority to mount them in the fort right away. During the summer of 1873 all efforts seem to have been concentrated on putting the important harbour defences into the most defensible state. By November each of the six fortifications reconstructed for RMLs had most of the heavy guns appropriated to them actually mounted[37] (Table 8). Perhaps significantly, the list of armament mounted in Halifax in November 1873 made no mention of the Citadel or its ordnance, although it included a statement of the light smooth bore pieces mounted at the Prince of Wales Tower, a less important work. It is dangerous to read too much into the omission of the Citadel from this list of pieces "actually mounted" but it might possibly indicate that some of the guns reported to have been mounted in September were dismounted by November and that work had begun on reconstructing emplacements for the latest approved armament. If that work had not commenced already it certainly must have begun shortly thereafter because there was a great deal to be done. The decision to mount so many RMLs (seven 7-inch and 29, 64-pounders) in the fort meant that the many smooth bore emplacements remaining on the ramparts had to be completely dismantled: guns, carriages, platforms and curbs removed. The earthen parapets had to be reshaped and new emplacements built containing brick-lined ammunition and shell recesses. Only in the case of the four emplacements where 7-inch Armstrong guns were mounted was the conversion to the new RMLs a relatively simple chore. Where these emplacements had been reconstructed during the mid-1860s apparently in ironstone,[38] to accommodate 7-inch RBLs they had been enlarged to the extent that no further major alterations were needed to mount either 64-pounder or 7-inch RMLs. By way of contrast, substantial structural changes were required at those emplacements where smooth-bore pieces were still mounted. A 7-inch RML on its long traversing platform needed considerably more space to be operated effectively than did either of its smooth-bore predecessors at the Citadel, an 8-inch or 32-pounder gun. In five locations on the redan and northeast salient approximately 30-foot sections of the dwarf retaining wall had to be removed and wooden platforms constructed that in effect extended the width of the terreplein. The additional space gave the 11-man gun crew enough room to work the 7-inch RML. In five locations in the fort, approximately 3-foot sections were cut through the dwarf retaining wall and munitions hoists installed adjacent to the openings. These were to lift the heavy projectiles and ammunition required by the new guns. All five of the openings and three of the hoists were still extant in August 1977.

In light of the great amount of work that must have gone on at each of the other RML fortifications in Halifax during the 1873 building season, it is unlikely that the many structural changes required at the Citadel were commenced that year. In 1874 the local engineering staff were probably much more able to turn their attention to the Citadel and the work required before mounting its new armament. By September 1873 there had been two changes in the nature of the pieces proposed for the ramparts of the fort. First, nine 64-pounder converted RMLs had been substituted for the nine 7-inch RBLs listed earlier in the year, making a total of 29, 64 pounders appropriated to the Citadel. Second, three smooth-bore mortars (two 13-inch and one 8-inch) were now listed among the Citadel's approved ordnance, all of which were to be located at the south end of the fort, where a need for 11 had been identified in January.[39] The proposed locations of the 60 pieces then recommended to be mounted in the Citadel are given in Table 18.[40] The Citadel's new ordnance was decided; the question remained, when would it be operational.

In March 1877 London approved a modest reduction in the proposed armament of the Citadel. In accordance with recommendations of the CRA and CRE in Halifax and the Defence Committee in Great Britain, it was agreed to mount only two 64-pounders (rather than three) above each of the faces of the north ravelin and only one 64-pounder at the north salient (rather than two).[41] It is not known to which of the two salients at the north end of the fort the "north salient" referred. By mid-1878, after approximately two decades of discussion on ways to upgrade the Citadel's armament, and several years' work reconstructing RML emplacements, there were only two pieces reported to be mounted in the entire fort, excluding the 11 guns in the saluting battery.[42] Apparently, even the 20, 24-pounder smooth bores in the defence casemates had been dismounted by this date, although they remained in the fort for at least another eight years.[43] The nature and location of the two mounted pieces were not specified but they were probably a 7-inch RML at the southeast salient and a 64-pounder RML at the salient of the southwest demi-bastion (Figs. 33 and 34).

To remedy the nearly defenceless situation and mount at least some of the pieces appropriated to the Citadel, £2000 was inserted in the

Army Estimate for 1878-79. Delays in the House of Commons in passing the Army Estimate early in the fiscal year prompted officials in the War Office to press for Treasury Board approval on the assumption that the Commons would pass the estimate. Treasury Board accepted the argument. On 20 June 1878 W. Law of the Treasury Board wrote to the Financial Secretary of the War Office that

> in consideration of the shortness of the building season at Halifax, Nova Scotia, My Lords sanction the immediate commencement, in anticipation of the passing of the Army Estimates by the House of Commons, of the work of mounting guns on the Citadel of Halifax, for which £2,000 is provided in Item 45 of Vote 13 of Army Estimates of the current year, as recommended by the Secretary of State.[44]

With Treasury Board approval the local officers in Halifax presumably set out to mount the guns in the fort (Fig. 35). During a mid-summer visit to Halifax aboard the Bellerophon Vice Admiral Englefield reported that it was "hoped that 15 of the most important will be in position by the end of the year."[45] As it turned out even that modest goal was not achieved. One full year later, in 1879, there were only eight emplacements on the ramparts "completed" while another six were described as "in hand."[46] By this time it must have become apparent to all concerned with the defence of Halifax, both in Britain and in the Nova Scotian capital, that the proposal authorized six years earlier to mount 60 pieces of ordnance in the Citadel would never be realized. In the end just slightly more than one-quarter of the proposed pieces were actually mounted. Even at that there was one further reduction in calibre; the 9-inch RML at the southeast salient was replaced by a 7-inch RML.

During the 1879 building season most, if not all, of the 17 pieces ultimately to be mounted in the Citadel were probably installed. In a number of locations, most conspicuously on the north and west ravelins, which were left without any ordnance, emplacements reconstructed for 64-pounder RMLs remained empty. As one would expect, given the changed conception of the Citadel's role, all of the mounted pieces could contribute to the defence of the harbour (Table 19). The west front, once the most heavily fortified of the Citadel fronts, mounted no armament whatsoever. Similarly, by the mid-1880s, at the latest, all of the 24-pounder smooth bores that had been in the defence casemates were dismounted.[47] In the new era of warfare Halifax would be won or lost without sieges on the Citadel and the ensuing infantry rush across the ditch, which the 24-pounders had once guarded against. Indeed, even with new rifled ordnance mounted on its seaward faces, the Citadel's usefulness as a harbour defence was gradually nearing an end.

The documents best revealing the decreasing importance of the Citadel are the Halifax Defence Schemes. When these top-secret contingency plans were first drawn up in the mid-1880s, the Citadel was identified as one of the seven fortifications in the Halifax area that could be called upon to repel an enemy attack. In the list of heavy guns mounted in the city, the Citadel's 11 RMLs were always duly noted. However, when it came to identifying which pieces would be manned in the event of an attack, a necessary choice because of the shortage of Royal Artillery in Halifax, none of the Citadel's guns nor Fort Charlotte's for that matter, were selected.[48] It was recognized that the keys

Table 18. Authorized Ordnance 1873-74[60]

	RMLs			Smooth Bore	Mortars		
	9-in.	7-in.	64-pr	24-pr	13-in.	8-in.	Totals
Northwest Demi-Bastion							
Right face			2				2
Salient			1				1
Left face			2				2
Curtain	no ordnance on ramparts						
Southwest Demi-Bastion							
Right face			1				1
Salient			1				1
Left face			1		1	1	3
Southeast Salient							
Right face					1		1
Salient	1						1
Left face	no ordnance on ramparts						
Redan							
Right face		2					2
Salient		1					1
Left face		2					2
Northeast Salient							
Right face			2				2
Salient		1					1
Left face			2				2
Defence Casemates				20			20
Cavalier			5				5
North Ravelin							
Right face			3				3
Salient			1				1
Left face			3				3
West Ravelin							
Right face			2				2
Salient			1				1
Left face			2				2
South Ravelin							
Salient		1					1
Totals	1	7	29	20	2	1	60

Note: This table is based on two different listings of authorized ordnance, one of which was drawn up in September 1873 and the other in January 1874. They were the same except that the latter did not make provision for the three mortars appropriated in the other to the south front.

Table 19. Mounted Ordnance - January 1886[61]

	RMLs		Mortars		
	7-in.	64-pr	8-in.	13-in. L.S.	Totals
Northwest Demi-Bastion	no ordnance mounted				
Curtain	no ordnance mounted				
Southwest Demi-Bastion					
Salient		1			1
Left face			1*	1*	2*
Southeast Salient					
Right face			3*	1*	4*
Salient	1				1
Redan					
Right face	2				2
Salient	1				1
Left face	1				1
Northeast Salient					
Right face		2			2
Salient	1				1
Left face		1			1
Defence Casemates	no ordnance mounted				
Cavalier	no ordnance mounted				
North Ravelin	no ordnance mounted				
West Ravelin	no ordnance mounted				
South Ravelin					
Salient	1				1
Totals	7	4	4	2	17

Note: Asterisks indicate exact location is not certain. The armament return describes them as mounted on the "southeast front," referring to what is commonly known as the south front. In addition to the mounted ordnance, there were 20, 64-pounder RMLs in the fort "without mountings", while the 20, 24-pounder smooth bores from the defence casemates were listed as "In work ready for mounting."

to the defence of the harbour were now the outer harbour fortifications. The military perception of the Citadel's importance during the late 19th century is aptly described in this excerpt from one of the defence schemes:

> The last and least pressing work would be to complete the defences of the Citadel, by removing the wooden roof over the seven guns that fire towards Dartmouth, and to give additional protection to the magazine by constructing a strong timber staging round them to carry a thick parapet of sandbags and rails. This would not be undertaken until all the other defences are done.[49]

While the Citadel's defensive capability vis à vis the outer forts declined steadily during the 1880s and 1890s, the British did not feel that it had ended quite yet. Following a visit to Halifax in 1888, the Inspector-General of Artillery (IGA), W.H. Goodenough, commented that the Citadel's ordnance was retained "presumably to act on the offensive against vessels which have forced an entrance." Goodenough seemed to agree with the reasoning, but he urged the Royal Artillery to ensure that the mortars mounted on the ramparts (in 1886 there were six [Table 19]) were capable of covering the water in front of the dockyard. The IGA observed that the fort remained the only defence against a landward attack. He suggested that it would be "desirable to have alternative positions for some of the 7-inch guns to fire landwards," as at present all pieces were mounted on the seaward faces.[50] Nothing was done to carry out this recommendation, perhaps because there were already vacant emplacements in the fort to which the 7-inch guns could be moved if needed or perhaps simply because the imperial authorities were unwilling to expend any more money on a fort of such limited usefulness. Certainly by the turn of the century, at the latest, the latter attitude had become dominant. In the defence scheme for 1900 the Citadel was for the first time no longer included among the list of the forts and batteries of Halifax. In the list of Halifax's permanent armament, no pieces were identified at the Citadel. The defensive capability of the old masonry fort by that date was listed as consisting solely of four .303-inch Maxims, to be manned by infantry.[51] The RMLs were either dismounted or considered too outdated in comparison with the latest developments in armament technology, BLs and QFs, to be mentioned. The Citadel would remain an administrative centre for the British military until their withdrawal in 1905-6, but, at last after half a century of successive armament proposals and actual changes, the era of the Citadel as an armed fortification had ended.

Mounted Ordnance in the Rifled Era, 1873 and 1880s

The introduction of rifled ordnance into the fortifications of Halifax led to unprecedented changes in the nature and extent of the city's defences. Although the attention of the British military authorities during the latter half of the 19th century focussed predominantly on the outer harbour defences, the need for armament changes at the Citadel was not ignored. During the 1860s and 1870s the Citadel underwent two revisions in its mounted ordnance which, because of the range and placement of the new pieces, completely altered the role the fort could play in the defence of Halifax. In the first revision the Citadel retained most of the smooth-bore guns mounted in the 1850s but added five rifled pieces (four 7-inch Armstrong guns and one 9-inch RML) at selected emplacements on the seaward faces. The selection of the locations to receive the new guns reflected the contention of the imperial authorities that the Citadel could best contribute to the defence of Halifax by providing coverage of the harbour. During the second revision all 68 of the pieces mounted in the early 1870s (including the five rifled guns recently added) were taken down and replaced by 11 RMLs (7, 7-inch and 4, 64-pounders), 6 mortars and several empty reconstructed emplacements. The trend begun

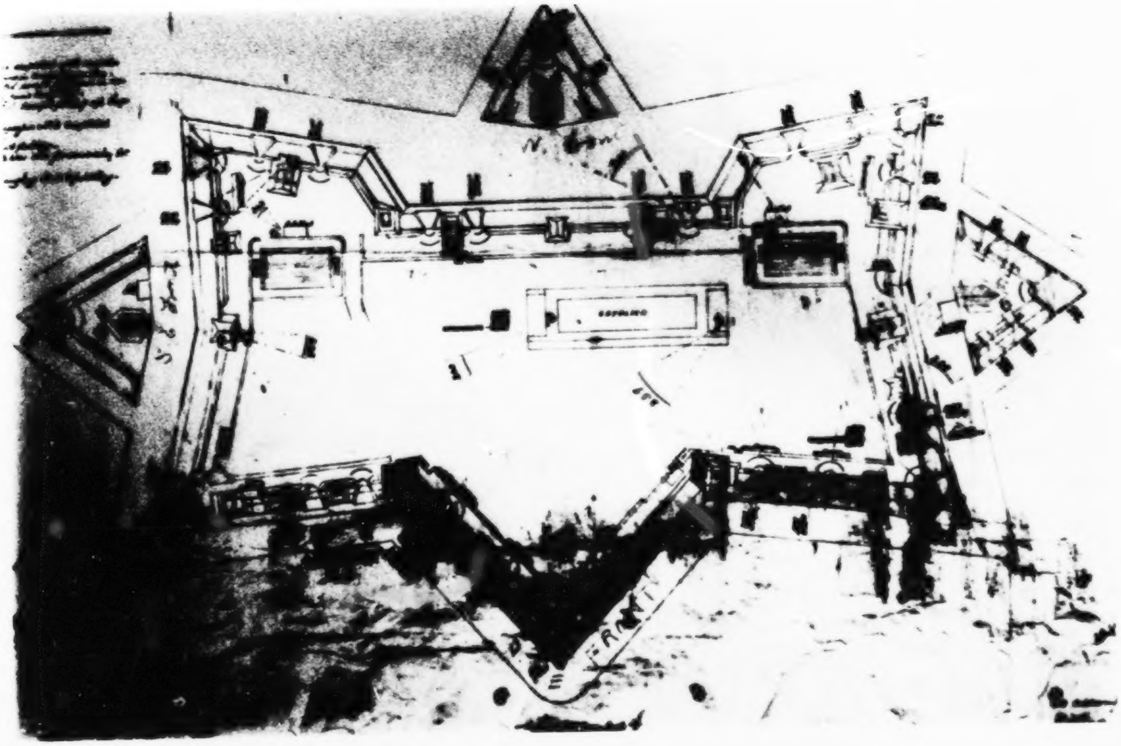


Figure 32. Plan of Citadel - 1879. When used in conjunction with Table 19 this plan illustrates the location of the ordnance mounted in the Citadel throughout the 1880s. As drawn it shows all of the emplacements that were proposed to be constructed on the ramparts during the second armament revision. Of the 32 emplacements shown on the plan, only 20 were built (or left as they were) and in only 11 were guns actually mounted. The plan does not show the location of the 6 mortars mounted at the south end of the fort. (*Public Record Office.*)

during the earlier revision was brought to a culmination in this armament change. All of the mounted pieces were for harbour defence; the landward fronts were left undefended. By the early 1880s the Citadel had become a virtual sea battery.

The pieces mounted in the Citadel during the two phases of rifled ordnance through which the fort passed are listed in Tables 17 and 19 and are described in the following account.

Northwest Demi-Bastion

The ordnance mounted in this location in the 1850s (one 8-inch and four 32-pounder smooth bores) was not touched in the first armament revision. During the second phase, in the mid- to late 1870s, all five smooth bores were dismounted and a new emplacement constructed at the salient angle where it was intended to mount a 64-pounder RML. Notwithstanding the intention, apparently no gun was ever mounted in the reconstructed emplacement.

Curtain

As in the smooth-bore period, no ordnance was mounted on the curtain during either of the changes in the 1860s and 1870s. An 1879 plan of the Citadel (Fig. 32) shows four emplacements for 64-pounders on the ramparts, but they do not appear to have ever been constructed.

Southwest Demi-Bastion

Three of the five smooth bores mounted in the 1850s in this section of the fort were taken down during the first revision of the Citadel's armament. Above each face a 32-pounder was removed while at the salient the 8-inch gun was replaced by a 7-inch rifled Armstrong gun. To mount the Armstrong an entirely new emplacement built of ironstone was constructed just slightly to the left of the salient angle and a section of the parapet removed to create an embrasure through which the new piece could fire on its dwarf traversing platform. Flanking the 7-inch gun were the 32-pounders, one above each of the left and right faces, remaining from the original armament. Each continued to be mounted on a dwarf traversing platform. The final pieces mounted in this section of

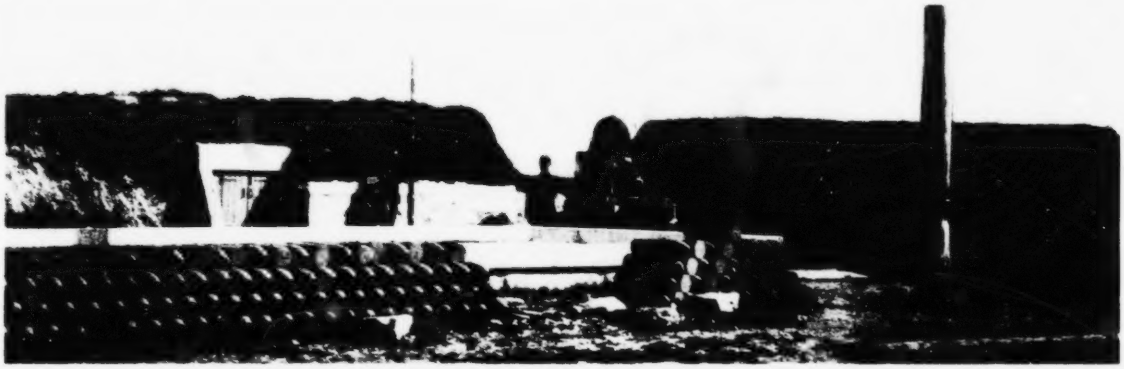


Figure 33. Southwest demi-bastion ca. 1879. The 64-pounder RML mounted on the traversing platform at the salient angle appears to have been mounted in the Citadel by August 1878 at the latest. The ironstone emplacement had originally been constructed for a 7-inch Armstrong RBL, which was dismounted during the mid-1870s. Two items worthy of note in the photograph are the flagpole to the right and the storage of shells (presumably for the 64-pounder) in the open air exposed to the Halifax climate. (*Public Record Office.*)

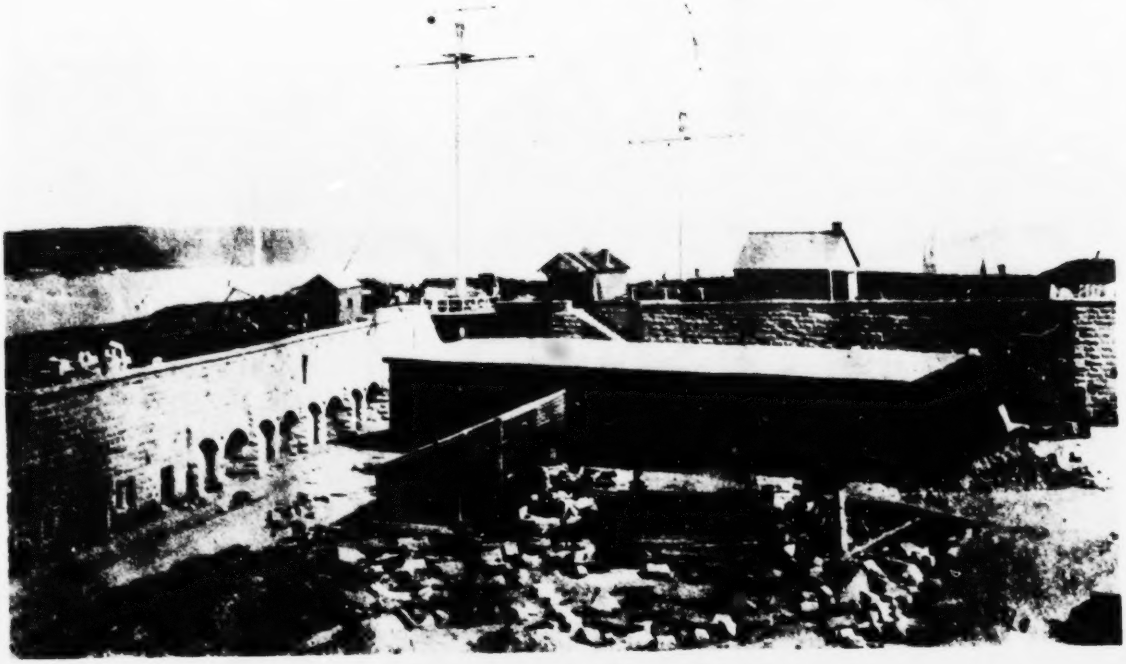


Figure 34. Southeast salient ca. 1879. This distant shot, taken from the roof of the Cavalier, is the only known photograph of the 7-inch RML mounted at the southeast salient. This piece, along with the 64-pounder in the southwest demi-bastion, seems to have been the only 2 guns mounted in the Citadel in August 1878. By the end of the following year an additional 9 pieces had been mounted in the fort. This photograph was probably taken in 1879 and gives an indication of the appearance of the courtyard as a consequence of the efforts being made to reshape the ramparts and reconstruct new emplacements for the Citadel's approved ordnance. (*Public Record Office.*)

the fort in September 1873 were mortars, one 8-inch and one 13-inch. They were mounted on the ramparts above the left face, probably in the locations identified in the 1850s (Fig. 27) for two of the 8-inch mortars in the Citadel's reserve ordnance. These two mortars probably continued to be mounted in this section of the fort until at least 1886. The armament listing for the Citadel drawn up in January of that year stated that there were six mortars (two 13-inch and four 8-inch mortars) mounted on what was described as the "Southeast front," by which designation was meant the entire south front of the fort. It seems likely that two of these six mortars were the ones mounted above the left face of the southwest demi-bastion in the 1860s and early 1870s. The only other piece of ordnance in the southwest demi-bastion in the mid-1880s was a 64-pounder RML (Fig. 33). It was probably mounted in either 1878 or 1879, replacing the 7-inch Armstrong gun installed during the earlier revision, in the new ironstone emplacement close to the salient angle.

Southeast Salient

There were four pieces mounted in this section of the fort in September 1873. The only rifled gun was a 9-inch RML at the salient angle. (This piece incidentally was the first RML to be mounted in the Citadel; the other rifled guns in the fort at the same time were of course, RBLs). It was mounted on a dwarf traversing platform and fired through an embrasure cut through the parapet slightly to the left of the salient. Its smooth-bore predecessor, an 8-inch gun, had rested on a common traversing platform and fired *en barbette*. The two 32-pounders installed above the left face in the 1850s continued to be mounted in the early 1870s, still in their original dwarf traversing platforms. The only piece mounted on the ramparts above the right face was a 13-inch mortar. Its exact location is unknown. The single 32-pounder originally mounted on the right face was dismounted by this time, probably having been removed shortly after the CRE requested the CRA to have it taken down in June 1864.

During the Citadel's second rearmament, in the late 1870s, both of the 32-pounders on the left face were removed but not replaced by any new pieces. It had originally been hoped to mount two 64-pounder RMLs on that face, but by 1878 that plan appears to have been given up. At the salient a 7-inch RML was substituted for the 9-inch gun mounted during the first revision (Fig. 34). The new piece was mounted on a dwarf traversing platform with A pivot.[52] During World War I, well after the Citadel's artillery role had ended, this 7-inch gun was still located on the ramparts of the southeast salient. The RML was no longer mounted at that date but was lying on the terreplein blocking the construction of a new signal station at that end of the fort. In late November 1916, permission was requested and received to bury the "old obsolete and out of date gun."[53] Besides the 7-inch RML the other pieces mounted at the southeast salient during the 1880s were mortars. As was explained in the section on the southwest demi-bastion, it is not certain how many mortars were mounted in specific locations along the south front, although it is known that there were six in total (two 13-inch and four 8-inch). Given the desirability of bringing as much fire power as possible upon the harbour, it seems quite likely that four of the six were located in the right face of the southeast salient and two on the left face of the southwest demi-bastion. If that analysis is correct, the mortars above the right face of the southeast salient were probably three 8-inch and one 13-inch pieces (the last one being retained from the preceding armament change).

Redan

Between 1860 and 1890 the redan ramparts probably witnessed more activity than any other area in the Citadel. As the fort's artillery orientation shifted increasingly toward the harbour and away from the landward approaches, it was usually to the redan that the engineers turned. During the first rearmament of the Citadel the redan received more rifled guns than any other section of the Citadel - two. These 7-inch Armstrong guns were placed in reconstructed emplacements, probably of ironstone, at the salient angle and above the right face, replacing an 8-inch and 32-pounder smooth bore, respectively. Both new pieces were mounted on dwarf traversing platforms. The other three guns from the smooth-bore era (two 32-pounders above the left face and one above the right beside one of the new pieces) were left as they had been mounted originally.

In the late 1870s in the second armament revision, all five of the above guns were taken down and the ramparts reconstructed for four 7-inch RMLs on dwarf traversing platforms with A pivots. It was an involved task as not only did the parapet have to be reshaped and granite emplacements built, but wooden platforms had to be constructed at the rear of the emplacements to extend the width of the terreplein so that gun crews could operate the lengthy RMLs effectively (Figs. 35 and 36). By August 1879 the emplacements for all four guns were "completed with exception of the earthwork adjoining them which is now in course of execution."[54] The guns themselves were probably in place by the end of the 1879 building season.

In the early 1880s the redan ramparts were covered with a roof presumably constructed to help keep dampness out of the officers' quarters located in casemates beneath.[55] The roof was probably completed in late 1883 or early 1884 and was designed so as not to impede the working of the four RMLs underneath the wooden covering. In addition to following the form of the embrasures, shutters were provided so that if mecessary the guns could be fired without having to remove any part of the structure. Interestingly, in comparison, in 1888 the Inspector-General of Artillery proposed that one or two of the guns in each of the most important fortifications be covered with light timber structures to protect the pieces from the Halifax winter.

> Under existing circumstances the effective defence of Halifax, during the winter months, would be extremely difficult. The time required to clear the guns for action is considerable, and to keep them clear of snow and ice for a long period would entail heavy labour.

By covering some of the pieces with timber structures they "could come into action in half-an-hour."[56] Presumably the RMLs under the roof on the redan of the Citadel could be brought into action at least that quickly.

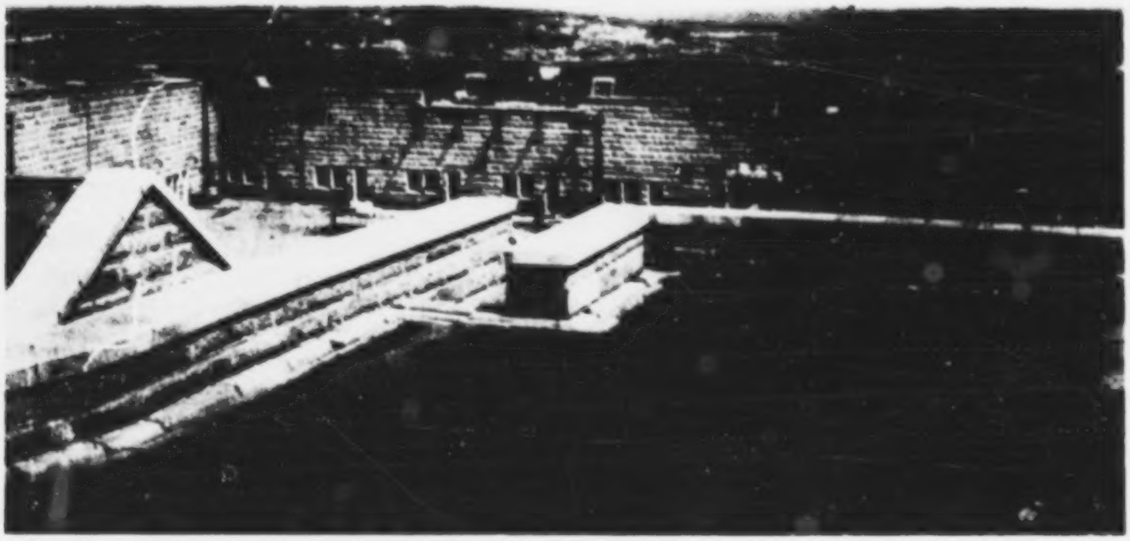


Figure 35. Northeast salient ca. 1879. This was probably a familiar scene around the Citadel during the 1879 building season. At one emplacement men seem to be busy laying curbs for the 64-pounder RML to be mounted there, while at the other a gyn has been set up to lift some heavy object essential for the construction of the new emplacement (perhaps some granite blocks, iron curbs, boards for the platforms, or the 64-pounder itself). (*Public Record Office.*)

Northeast Salient

The five smooth-bore guns mounted on the northeast salient during the 1850s were not touched in the first revision of the Citadel's armament. In the course of the second revision, however, there was a great deal of activity in this section of the fort. The old smooth-bore pieces were removed and the ramparts reconstructed for four rifled guns, a 7-inch RML at the salient, two 64-pounder RMLs above the right face and a single 64-pounder above the left face. As happened on the redan it was necessary to remove sections of the granite dwarf retaining wall and install wooden platforms to increase the amount of operating room available to gun crews working the 64-pounders. This was not necessary with the 7-inch RML as it was located at the salient and there was enough space behind the mounted piece to permit it to work effectively. Most of the reconstruction work seems to have been carried out in 1878 and 1879. In late August 1879 it was reported that the emplacements for the three 64-pounders were "completed except platforms in rear and racers; all earthworks adjoining three guns completed."[57] The 7-inch RML was listed as being "in hand." Presumably all four pieces were in place by the end of the year.

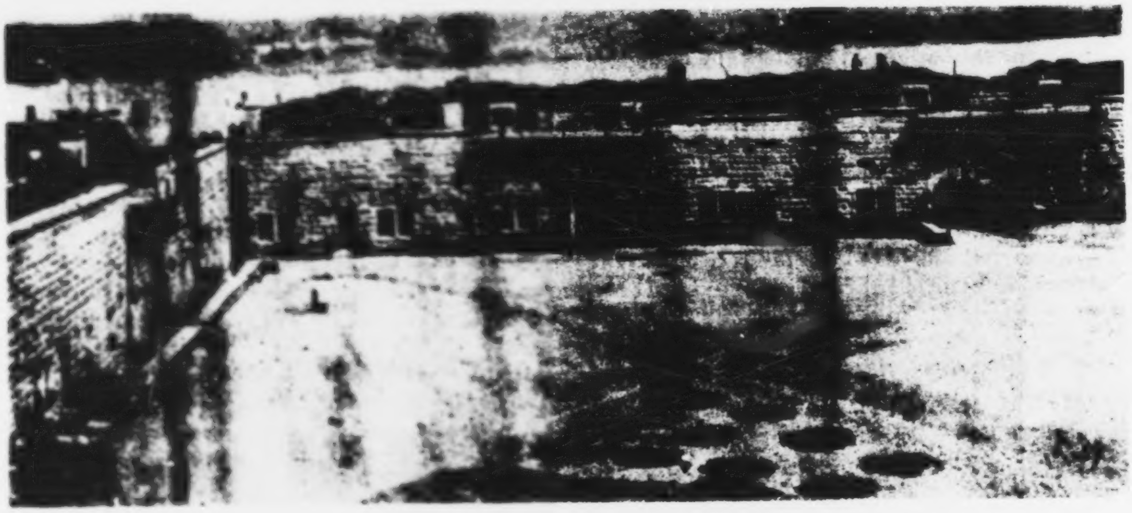


Figure 36. Redan - 1879. The most interesting thing to note in this photograph is the unfinished parapet on the redan ramparts. Visible in the photograph are the boards used to frame the desired shape of the parapet, serving as a guide to the crews working with the earth and sod. (*Public Record Office.*)

Defence Casemates

The 24-pounder smooth bores installed in the defence casemates in the 1850s continued to be mounted until at least the mid-1870s and probably into the 1880s. The first rearmament of the Citadel did not involve them in any way. In fact, a September 1873 armament proposal for the Citadel envisioned a continuing role for the 24-pounders. Sometime during the second revision, however, the smooth bores were finally dismounted. In January 1886 the 20 pieces were described as being in the fort but dismounted.[58]

Cavalier

Two of the seven 32-pounder smooth bores on the Cavalier in the 1850s were dismounted sometime before September 1873. The two guns, probably the ones at either end of the building, may possibly have been removed during the first armament revision, although there is no evidence to indicate that. In any case the ordnance proposals approved in September 1873 and January 1874 (Table 18) both suggested mounting five 64-pounder RMLs on the Cavalier terreplein. This was never carried out and by January 1886 at the latest, the five 32-pounders had been dismounted.

North Ravelin

The seven 32-pounders mounted in the 1850s on the north ravelin were not touched during the first rearmament of the fort. In accordance with the authorized proposals of 1873-74 (Table 18) the ravelin was made ready during the late 1870s to mount seven 64-pounder RMLs. In effect this only meant the reconstruction of the emplacement at the salient angle as the other six rifled guns were to be mounted simply on standing garrison carriages on the same stone-ground platforms used during the smooth-bore era. The piece at the salient was to be mounted on a dwarf traversing platform. The emplacement at the salient was reconstructed as planned but no ordnance was mounted on the ravelin after the smooth bores were removed (Fig. 37).

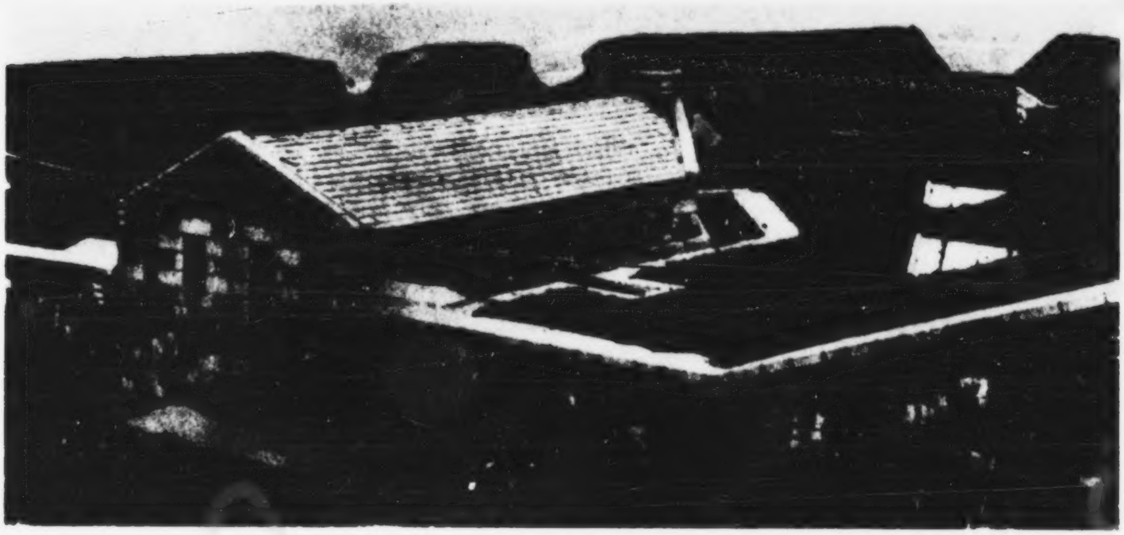


Figure 37. North ravelin - 1879. Although the initial intention of the imperial authorities was to mount a 64-pounder RML at the reconstructed granite emplacement at the salient of the north ravelin, no piece was ever mounted in that location. The north ravelin was certainly not alone in this respect as other reconstructed emplacements were left empty on the west ravelin and at the salient of the northwest demi-bastion. (*Public Record Office.*)

West Ravelin

The situation in the west ravelin was exactly the same as on the north ravelin. The smooth-bore ordnance was not altered until sometime after 1873 when the 32-pounders were dismounted and the emplacement at the salient angle reconstructed for a 64-pounder on a dwarf traversing platform. Neither that gun nor the 64-pounders, intended to be mounted on the stone-ground platforms above the faces, were ever mounted.

South Ravelin

This was the only ravelin ever to have pieces of rifled ordnance installed. In the mid-1860s a 7-inch Armstrong gun was mounted on a dwarf traversing platform at the salient angle in a reconstructed ironstone emplacement. The six 32-pounders mounted above the faces of the ravelin during the 1850s do not appear to have been altered at the time. They were still mounted on their granite-ground platforms in September 1873. In the Citadel's second armament revision all seven of the above pieces were removed along with the six granite-ground platforms above the faces (or perhaps they were simply buried). The ironstone emplacement at the salient was left basically as it was and a 7-inch RML mounted there on a dwarf traversing platform, A pivot. This piece was probably set in place in the 1879 building season (Fig. 38).

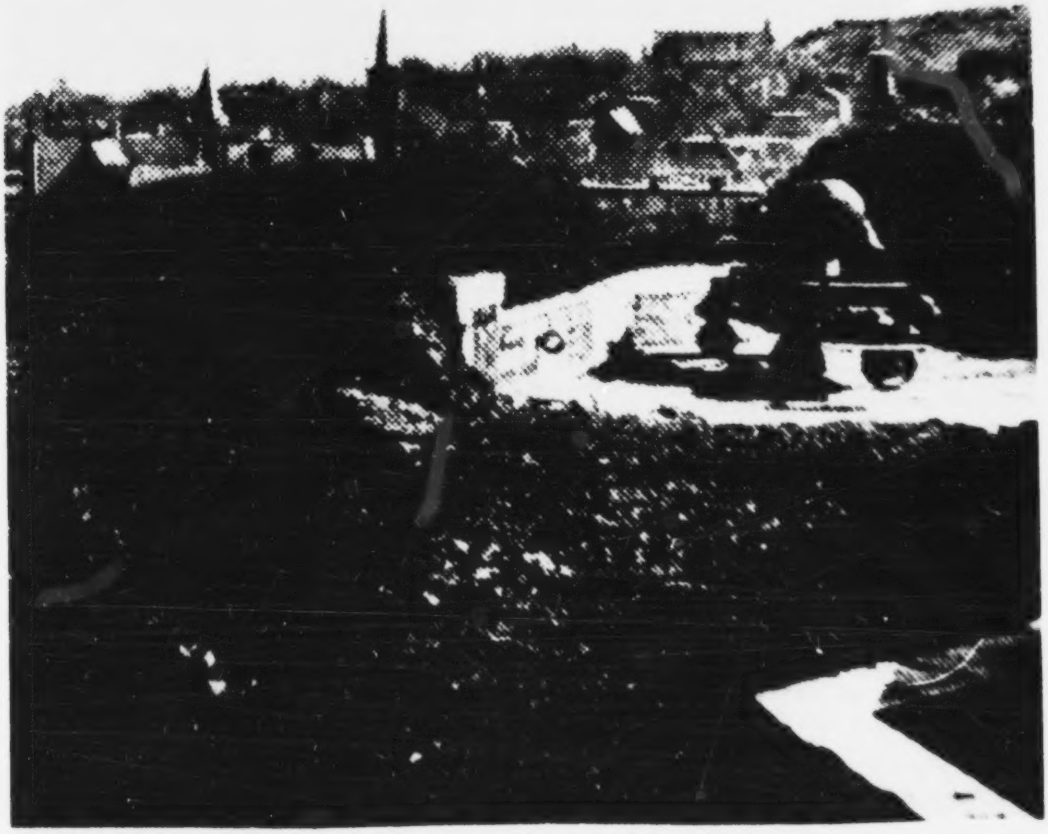


Figure 38. South ravelin - 1880s. All 7 of the 7-inch RMLs in the Citadel were mounted like this one on the south ravelin, on a dwarf traversing platform with A pivot. The emplacement was originally reconstructed for a 7-inch Armstrong gun which was probably dismounted in the mid-1870s. The 7-inch RML was likely mounted in the fall of 1879. (*Legislative Library of Nova Scotia.*)

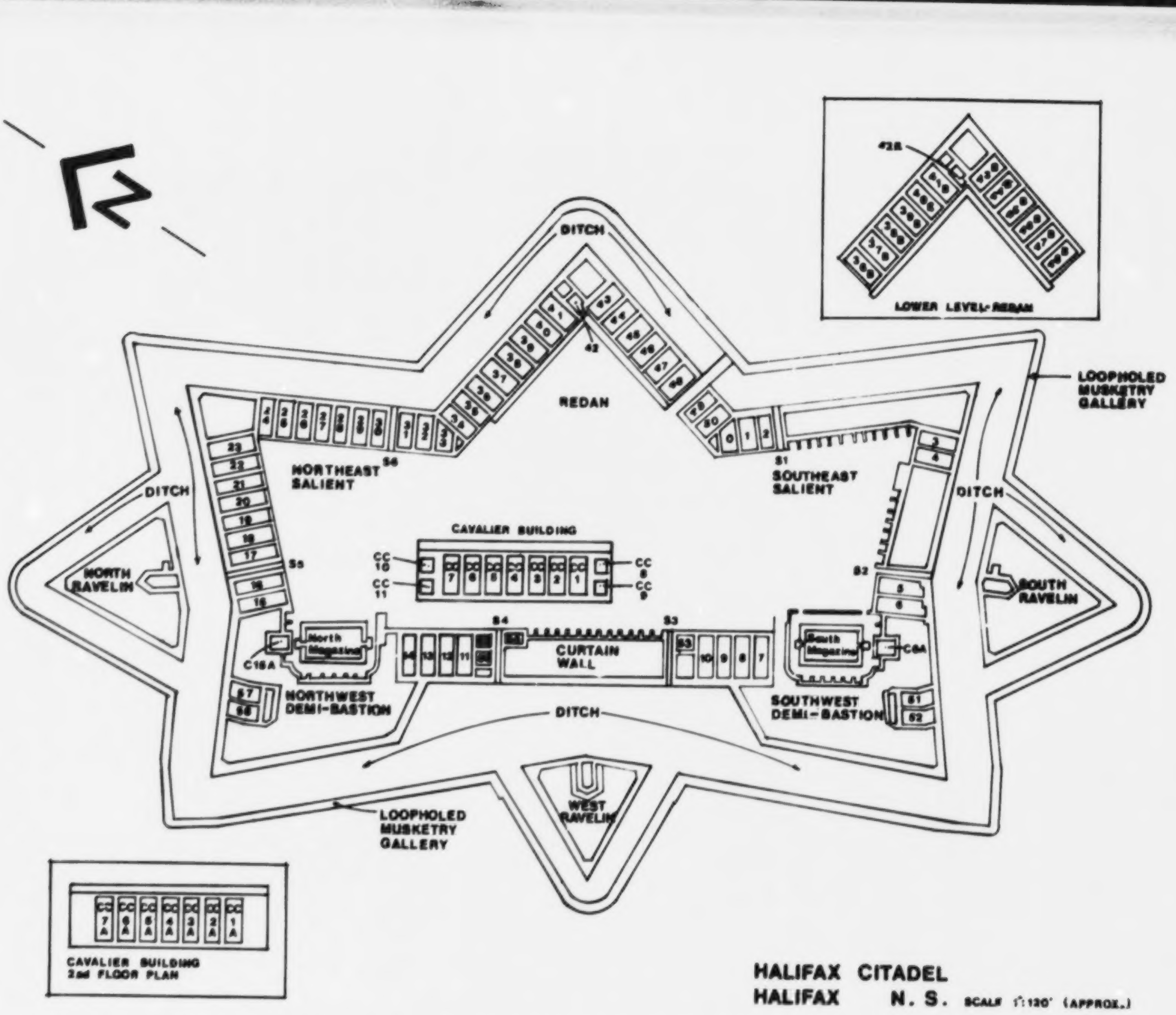

N
DITCH
LOOPHOLED MUSKETRY GALLERY
LOWER LEVEL-REDAN
42B
42
REDAN
NORTHEAST SALIENT
SOUTHEAST SALIENT
S1
S2
S3
S4
S5
S6
DITCH
NORTH RAVELIN
SOUTH RAVELIN
CAVALIER BUILDING
CC 10
CC 11
CC 8
CC 9
North Magazine
South Magazine
C16A
C8A
CURTAIN WALL
NORTHWEST DEMI-BASTION
SOUTHWEST DEMI-BASTION
DITCH
LOOPHOLED MUSKETRY GALLERY
WEST RAVELIN
CC 7A
CC 6A
CC 5A
CC 4A
CC 3A
CC 2A
CC 1A
CAVALIER BUILDING 2nd FLOOR PLAN
HALIFAX CITADEL
HALIFAX N. S. SCALE 1":120' (APPROX.)

Figure 39. Citadel location plan. This is a base plan of the Citadel naming the various sections.

ENDNOTES

The Guns of Halifax (1825-1906)

1 The prevailing scepticism of the post-war period is best illustrated by quoting John Quincy Adam's famous remark that the Treaty of Ghent was "a truce rather than a peace." K. Bourne, Britain and the Balance of Power in British North America, 1815-1908 (Berkeley and Los Angeles: University of California Press, 1967), p. 9.

2 Arthur Wellesley, 1st Duke of Wellington, Despatches, Correspondence, and Memoranda of Field Marshall Arthur, Duke of Wellington, K.G., edited by his son, the Duke of Wellington, K.G. (London: J. Murray, 1867-1880), Vol. 2, p. 444, No. 466, Draft of Instructions to Ordnance Commission in North America, 11 April 1825.

3 John Joseph Greenough discusses the difficulties in securing Parliamentary approval for the measures proposed by the Smyth Commission in his study The Halifax Citadel, 1825-60: A Narrative and Structural History, Manuscript Report Series No. 154 (Ottawa: Parks Canada, 1974), Part 1, Volume 1, pp. 24-35.

4 Canada. Public Archives (hereafter cited as PAC), RG 8, II, Vol. 6-2, "Copy of a Report to His Grace the Duke of Wellington ... Relative to His Majesty's North American Provinces by a Commission of which M. General Sir James Carmichael Smyth was President ... 1825" (hereafter cited as Smyth Report), paragraph 52, dated Halifax, 9 September 1825, at the end of the report.

5 Ibid., p. 118.

6 Ibid., p. 118, 119. The six sea batteries referred to in the Smyth Report were Forts Clarence and Charlotte, and Grand, Ogilvie, Point Pleasant and Northwest Arm Batteries. At the time of the report the masonry of Sherbrooke Tower had only been completed to a height of eight feet (Appendix A, p. 26). The commissioners identified £40,000 for the work on Fort Clarence, while the estimates for Sherbrooke Tower and Fort Charlotte were included in the overall figure of £160,000 for those two sites and the Citadel (Appendix B, final page).

7 Ibid., p. 120.

8 Ibid., p. 121.

9 Ibid., Appendix A, p. 25.

10 Ibid. As explained in footnote 6 the estimate for the proposed work on Citadel Hill included estimates for Fort Charlotte and Sherbrooke Tower. The combined figure was £160,000. A tower was proposed for Needham Hill at the estimated cost of £6000 (Appendix B, final page).

11 Ibid., p. 120.

12 Needless to say, others before the Smyth Commission had lamented the lack of planning which had gone into the erection of the

Halifax defences. To illustrate, following the American Revolution the CRE, Robert Morse, criticized the haphazard manner in which defences had been erected and commented "that it is in time of peace we should guard against war."

13 Smyth Report, p. 136.

14 Ibid., p. 137.

15 PAC, MG 12B, WO 55, Vol. 1558, section 5, pp. 6-26, Nicolls to Mann, 30 June 1827.

16 PAC, MG 12B, WO 55, Vol. 864, pp. 524-27, Carmichael Smyth to Mann, 20 September 1827.

17 Cited on plan in Ivan J. Saunders, "A History of Martello Towers in the Defence of British North America, 1796 - 1871," *Canadian Historic Sites: Occasional Papers in Archaeology and History*, No. 15 (1976), p. 106.

18 Smyth Report, pp. 24-26.

19 Nova Scotia. Public Archives (hereafter cited as PANS), MG 12, RE 53, (unpaginated), "Return of the Defences in the Provinces of Nova Scotia, New Brunswick and Prince Edwards Island." 13 August 1834.

20 Harry Piers, *The Evolution of the Halifax Fortress, 1749-1928* (Halifax: Public Archives of Nova Scotia, 1947), Appendix IV, p. 88.

21 PAC, MG 12B, WO 44, Vol. 49, fols. 438-440, "Report of the State of the Works Ordnance and Carriages, at the Several Forts, Towers & Batteries at Halifax, N.S. and the Harbour Posts with a view to future Armament," 25 February 1852.

22 Ibid., fol. 437. They recommended 32-pounders of nine feet, six inches. They did not indicate whether they preferred the 56-cwt model or the 58-cwt model. The 70 new guns would be distributed as follows: Fort Clarence - 12, Fort Charlotte - 30, Point Pleasant Battery - 10, Northwest Arm Battery - 4, Fort Ogilvie - 6, York Redoubt - 8.

23 The Citadel's armament had been approved by the Director-General of Artillery on 17 September 1846 and by the Master-General and Board of Ordnance on 2 October 1846. PAC, MG 12B, WO 55, Vol. 1558, Section 7, p. 29, 5 May 1856.

24 In 1825, 71 of the 83 pieces listed were 24-pounders (Smyth Report, Appendix A, pp. 24-26) while in 1834, 43 of 58 were 24-pounder guns (PANS, MG 12, RE 53, 13 April 1834). In 1852, 72 of the 97 mounted pieces were 24-pounder guns (PAC, MG 12B, WO 44, Vol. 49, f. 431, 439).

25 The long 24-pounder gun (nine feet, six inches) had a range of 760 yards at 1° elevation and 2450 yards at 10° elevation. The long 32-pounder gun (nine feet, six inches) could fire approximately 3000 yards at 10° elevation. Major Miller, R.A., *Equipment of Artillery* (London: H.M.S.O., 1864), pp. 308-10, 316.

26 PAC, MG 12B, WO 44, Vol. 49, fols. 448-450, Director-General of Artillery to Secretary of Board of Ordnance, 5 August 1852.

27 Ibid., fols. 456-58, Director-General of Artillery to Secretary of Board of Ordnance, 7 October 1853.

28 Ibid., fol. 461, Commanding Royal Engineer to Inspector-General of Fortifications, 20 November 1854.

29 Ibid., fol. 461, 462.

30 Ibid., fol. 463, Director-General of Artillery to Secretary of Board of Ordnance, 22 December 1854.

31 Ibid., fols. 464, 465, CRE to IGF, 20 April 1855.

32 Ibid., fol. 465, marginal note by Storekeeper, Office of Ordnance, 28 May 1855.

33 PAC, MG 12B, WO 55, Vol. 1558, section 7, pp. 61-73, "Report of Committee on State of Citadel and Harbour Defences of Halifax, Nova Scotia," 5 May 1856.

34 PAC, MG 12B, WO 55, Vol. 887, fols. 508v, 508A, CRE to IGF, 17 January 1855, referred to the guns already being in place on ramparts and on the cavalier.

35 J.B. Brebner, "Joseph Howe and the Crimean War Enlistment Controversy Between Great Britain and the United States," *Canadian Historical Review*, Vol. 11 (1930), pp. 305-27.

36 PAC, MG 12B, WO 55, Vol. 887, fols. 553, 554, GOC (LeMarchant) to Secretary of State for War, 2 July 1855.

37 Ibid., fols. 599, 601v., CRE (Stotherd) to IGF, 26 September 1855.

38 Ibid., fol. 608. There were also 63 members of the foreign legion, staying on Melville Island, who had been recruited in the United States and one man from the Royal Newfoundland Company.

39 PAC, MG 12B, WO 55, Vol. 1558, Section 7, p. 33, "Report of Committee on State of Citadel and Harbour Defences ...," 5 May 1856.

40 PAC, RG 8, "C" Series. Vol. 1671, pp. 531-37, "Inspectional Report of the present state of Fortifications, Storehouses, Casemated Barracks, and Hospitals, Cisterns, Acqueducts and Buildings of every description in the charge of Her Majesty's War Department in Nova Scotia and New Brunswick," 18 November 1861.

41 The types and numbers of ordnance mounted throughout the British Empire in January 1860 were as follows: 8-inch guns (648), 68-pounder guns (413), 32-pounder guns (1265), 24-pounder guns (1364), 18-pounder guns (448), 12-pounder guns (261), howitzers of different calibres (241), mortars of different calibres (244) and carronades of different calibres (695). Charles Callwell and John Headlam, *The History of the Royal Artillery From the Indian Mutiny to the Great War*. Vol. 1 (1860-99), (Woolwich: Royal Artillery Institution, no date), Appendix E.

42 O.F.G. Hogg, *Artillery: Its Origin, Heyday, and Decline* (London: C. Hurst & Co., 1970), pp. 80, 81; H.C.B. Rogers, *Artillery Through The Ages* (London: Seely Service & Co., 1971), p. 93.

43 Rogers, *Artillery Through the Ages*, p. 93; Callwell and Headlam, *The History of the Royal Artillery ...* Vol. 1, p. 144. The accuracy of the Lancaster guns was irregular and the projectiles sometimes jammed.

44 Public Record Office (hereafter cited as PRO), WO 33, Vol. 7, (018), "Memorandum on the probable effect of the Rifled Cannon on the Attack and Defence of Fortifications," n.d.

45 Ian V. Hogg, *Coast Defences of England and Wales, 1856-1956* (London: David and Charles, 1974), pp. 19-26.

46 The events of the first year of the war as they affected Anglo-American relations are discussed in detail in Brian Jenkins' *Britain and the War for the Union* (Montreal: McGill-Queen's University Press, 1974). The following account of the *Trent* crisis is based largely on Jenkins' narrative.

47 Doyle to Gordon; 24 November 1861, quoted in R.H. McDonald, "The Public Career of Major General Sir Charles Hastings Doyle, 1861-1873," M.A. thesis, Dalhousie, 1969, p. 7.

48 PAC, RG 8, "C" Series, Vol. 1671, pp. 15, 16, GOC (Doyle) to Secretary of State for War, 28 November 1861.

49 Donald Creighton, Dominion of the North (Toronto: MacMillan, 1967), p. 287.

50 PAC, RG 8 "C" Series, Vol. 1671, p. 53, Lewis to GOC (Doyle), 21 December 1861.

51 Ibid., Vol. 1529, p. 436, DAG to GOC, 21 December 1861.

52 Hogg, Coast Defences of England and Wales, p. 248; Miller, Equipment of Artillery, p. 281.

53 PAC, RG 8, "C" Series, Vol. 1649, p. 51, 52, Jervois to CRE, 14 December 1861.

54 Ibid., p. 66, 67, Jervois to CRE, 21 December 1861.

55 Ibid., Vol. 1430, p. 235, "Report on Nova Scotia Defences - Halifax," 17 January 1862.

56 Ibid., p. 237.

57 Ibid., p. 238.

58 Ibid., p. 238-41.

59 Ibid., p. 239-41.

60 Ibid., p. 237.

61 Ibid., p. 241.

62 Ibid., Vol. 1529, p. 148, DAG to GOC, 5 February 1862. Approval had been given on 22 January 1862. Reference was made to an earlier report (27 November 1861) submitted by the CRA and CRE. Presumably it contained most, if not all, of the same recommendations put forth in the 17 January 1862 report discussed above.

63 Ibid., Vol. 1649, p. 91, 92, Jervois to CRE, 8 March 1862.

64 Ibid., p. 97, Deputy, IGF (Maj.-Gen. T. Foster) to CRE, 11 March 1862.

65 Ibid., p. 144-46, Jervois to CRE, 26 July 1862.

66 Piers, The Evolution of the Halifax Fortress, p. 50.

67 PAC, RG 8, "C" Series, Vol. 1430, p. 317, Westmacott to Doyle, 17 January 1863.

68 Ibid., p. 319, 326.

69 Ibid., p. 319, 320, 326.

70 Ibid., p. 320, 326.

71 Ibid., p. 323.

72 Ibid., p. 325, 326.

73 PAC, MG 12B, WO 55, Vol. 1558, Part 8, fols. 1-8, "Observations on Defence, 1863, Nova Scotia and New Brunswick," 22 January 1863. The list of proposed armament is on folio 8.

74 PAC, RG 8, "C" Series, Vol. 1649, p. 192-95, Jervois to Westmacott, 6 February 1863.

75 Ibid., p. 202, Jervois to CRE, 27 February 1863.

76 Ibid., Vol. 1436, p. 318-20, Westmacott to IGF, 30 April 1863.

77 Ibid., Vol. 1431, p. 77, CRE to GOC, 18 September 1863.

78 Piers, The Evolution of the Halifax Fortress, p. 53.

79 PAC, RG 8, "C" Series, Vol. 1431, pp. 64, 65, "Statement of Armament proposed for the undermentioned works, now in course of preparation," 14 August 1863.

80 Ibid., Vol. 1530, pp. 70, 71, DAG to GOC, 25 March 1863.

81 Ibid., p. 505, DAG to GOC, 7 June 1864. Five 7-inch Armstrong guns and 13, 68-pounders were ordered for Halifax on 24 March 1863.

82 Ibid., Vol. 1431, pp. 77, 78, "Memo on the Progress of the Defences etc., respecting points of detail not yet decided," 18 September 1863, marginal comments by Jervois.

83 The entire section on the *Chesapeake* incident is based on R.H. McDonald's "Second Chesapeake Affair: 1863-64," *Dalhousie Review*, Vol. 54, (1974-75), pp. 674-684.

84 PAC, RG 8, "C" Series, Vol. 1653A, p. 322, "Report and Estimate of Works and Repairs ... 1864-65."

85 Ibid., Vol. 1530, p. 504, 505, DAG to GOC, 7 June 1864.

86 Piers, *The Evolution of the Halifax Fortress*, p. 53, footnote 5.

87 PAC, Dept. of Militia and Defence Records, RG 9, II, Al, Vol. 600, p. 37, "Report on the Defence of the British Naval Stations in the North Atlantic ...," 25 January 1865, by WFD Jervois, RE, Deputy-Director of Fortifications. Jervois stated that the construction of a work on Ives Point "has been commenced."

88 Library of Royal Artillery Institution (henceforth cited as LRAI), Lefroy Papers, "General Report of Director of Ordnance," 1864-65, p. 4.

89 Ibid., p. 7.

90 PAC, RG 9, II, Al, Vol. 600, pp. 31-36, "Report on the Defence of the British Naval Stations in the North Atlantic," 25 January 1865.

91 Ibid., pp. 37-40, 48.

92 Ibid., p. 48.

93 PAC, RG 8, "C" Series, Vol. 1531, pp. 628, 629, DAG, RA to GOC, 19 May 1866.

94 Hogg, *Coast Defences of England and Wales*, p. 37.

95 PAC, RG 8, "C" Series, Vol. 1530, pp. 17, 18, DAG to GOC, 13 January 1863.

96 Hogg, *Coast Defences of England and Wales*, pp. 37-39.

97 Rogers, *Artillery Through The Ages*, pp. 96-100.

98 C.S. MacKinnon, "The Imperial Fortresses in Canada: Halifax and Esquimault, 1871-1906," Ph.D. thesis, Toronto, 1965, pp. 51-52.

99 PAC, RG 8, "C" Series, Vol. 1431, p. 233, CRE to CRA, 18 April 1865.

100 Ibid., p. 313, CRE to CRA, 14 October 1865.

101 Ibid., Vol. 1431, p. 244, CRE to Supt. of Stores (Pengelly), 25 May 1865.

102 Ibid., p. 247, Dumaresq, RE, to Deputy Supt. of Stores, 14 June 1865.

103 Ibid., Vol. 1653A, p. 434, "Report and Estimates ... 1866-67."

104 Ibid., Vol. 1531, pp. 628, 629, DAG, RA to GOC, 14 May 1866.

105 Ibid., p. 800, AAG, RA to GOC, 3 September 1866.

106 Ibid., p. 629, DAG, RA to GOC, 19 May 1866.

107 LRAI, Lefroy Papers, "General Report of the Director of Ordnance, 1865-66," p. 11.

108 Ibid., 1866-67, p. 11.

109 Hogg, *Coast Defences of England and Wales*, p. 252.

110 This conclusion is based on the fact that no remaining work was indicated for these two batteries in the estimate for 1867-68. PAC, RG 8, "C" Series, Vol. 1653-A, p. 470, "Report and Estimates ... 1867-68."

111 PAC, RG 8, "C" Series, Vol. 1653-A, p. 438, "Report and Estimate ... 1866-67." The site in question is referred to as Cliff Battery, Maugher Beach. It is hard to imagine what it might be other than the area where Strawberry Battery was erected.
112 Ibid., p. 462, "Report and Estimate ... 1867-68."
113 Acadian Recorder. 16 February 1867, p. 2, column 6; in "Local and Other Items."
114 The estimate for 1868-69 called for the completion of a four-gun casemated battery at Fort Charlotte, PAC, RG 8, "C" Series, Vol. 1653-A, p. 558, "Report and Estimate ... 1868-69."
115 Ibid., p. 469, "Report and Estimate ... 1867-68."
116 Ibid., Vol. 1532, p. 226, DAG to GOC, 10 June 1867.
117 Ibid., p. 421, DAG to GOC, 6 November 1867.
118 LRAI, Lefroy Papers, "Fourth Report of the Director of Ordnance," 1867-68, pp. 8, 9.
119 PAC, RG 8, "C" Series, Vol. 1653-A, p. 546, "Report and Estimate ... 1868-69."
120 LRAI, Lefroy Papers, "Fourth Report of the Director of Ordnance," 1867-68, p. 9. Doyle was notified that appropriation of four 10-inch RMLs for Fort Charlotte was approved in late October 1868. PAC, RG 8, "C" Series, Vol. 1532, p. 700, [illegible], Horse Guards to GOC, 16 October 1868.
121 PAC, RG 8, "C" Series, Vol. 1656, p. 4, "actually mounted, 24/11/73," n.d.
122 Ibid., Vol. 1653-A, pp. 576-89. "Report and Estimate ... 1869-70."
123 Old War Office Library (hereafter referred to as OWOL), RA and RE Works Committee Reports, "Memorandum by the Defence Committee on the Defences of Halifax, N.S.," 17 June 1872, p. 1.
124 OWOL, RA and RE Works Committee, "Omission of 4 - 9-inch Guns at Fort Charlotte, Halifax ...," n.d., unpaginated.
125 Ibid.
126 PAC, RG 8, "C" Series, Vol. 1533, p. 537-38, [illegible] War Office to GOC, 5 January 1871.
127 Ibid., [illegible] War Office to GOC, 28 March 1871. Marginal note dated 29/4/71 indicated that the CRA had forwarded the demand for guns.
128 Acadian Recorder, 15 June 1872, p. 2, col. 5, in "City News."
129 PAC, RG 8, "C" Series, Vol. 1534, pp. 441-43, [illegible] Surveyor General Dept., WO to GOC, 11 January 1873.
130 Acadian Recorder, 12 May 1873, p. 2, col. 5, in "City News."
131 The embrasures at Fort Clarence being constructed for 7-inch guns there were a number of problems involved in mounting 9-inch RMLs there. "The alteration of the armament from 7-inch to 9-inch guns has caused the diminution of the amount of elevation attainable by the guns in this battery." The CRE was instructed to remove the vertical bars in the embrasures which might prevent the "free laying" of the larger guns. PAC, RG 8, "C" Series, Vol. 1534, pp. 861-63, [illegible] War Office to GOC, 24 December 1874.
132 PRO, Adm. 1/6448, "Sea Defences of Halifax," Vice Admiral Englefield to Secretary of Admiralty, 22 July 1878.
133 PRO, WO 78/2944, The Citadel, Halifax, Nova Scotia: Plan of Revised Armament, 28 August 1879.
134 MacKinnon, "The Imperial Fortresses in Canada," p. 74.

135 OWOL, Defence Committee Papers, No. 108, "Memorandum on a proposal that the Northwest Arm Battery should cease to be included in the Defences of Halifax," 21 July 1884.

136 MacKinnon, "The Imperial Fortresses in Canada," p. 75.

137 K.W. Maurice-Jones, The History of Coast Artillery in the British Army, (London: Royal Artillery Institution, 1959), p. 20.

138 Callwell and Headlam, The History of the Royal Artillery from the Indian Mutiny to the Great War. Vol. 1 (1860-99), (Woolwich: Royal Artillery Institution, n.d.), pp. 176, 177.

139 Roger Sarty, "Local Boys and Redcoats, The Relations of the Militia in Nova Scotia and the British Garrison at Halifax, 1860-1906," Unpub. MA Research Paper, Duke, 1976.

140 MacKinnon, "The Imperial Fortresses in Canada ...," p. 78.

141 PRO, Cab. 11, Vol. 28, p. 2, "Halifax, Amended Scheme of Defence," March 1890; MacKinnon, "The Imperial Fortresses in Canada ...," p. 78.

142 Ibid., pp. 237, 238.

143 Hogg, Coast Defences of England and Wales, p. 72. Most of the preceding paragraph is based on pages 70-72 in Hogg's work.

144 PRO, Cab. 5, Vol. 1, "Memorandum on the Standards of Defence for the Naval Bases of Halifax, Bermuda, Jamaica, and St. Lucia," (n.d.), p. 1.

145 OWOL, Royal Artillery and Royal Engineers Works Committee, Minute 248, Report No. 18, "Revision of the Armaments of Halifax," 12 January 1886, p. 1.

146 Ibid., "Memorandum on the Defences of Halifax," Defence Committee Meeting of 17 July 1886, p. 1, changes in handwritten notes.

147 Piers, The Evolution of the Halifax Fortress, p. 60.

148 PRO, Cab. 11, Vol. 28, Part 4, Halifax Scheme of Defence, Revised to September 1891, p. 140.

149 OWOL, RA and RE Works Committee, Minute 248, Report No. 18, "Revision of the Armaments of Halifax," 12 January 1886, p. 1.

150 Callwell and Headlam, The History of the Royal Artillery, Vol. 1, pp. 313, 314.

151 PAC, RG 8, "C" Series, Vol. 1547, pp. 427-31, Col. PE Hill to Chief Staff Officer, Halifax, 12 March 1889.

152 PRO, Cab. 11, Vol. 28, Part 3, Halifax Amended Scheme of Defence (Printed 1890), p. 34.

153 Ibid., Part 4, Halifax Scheme of Defence, Revised to September 1891, p. 140.

154 Ibid.

155 Ibid., Part 11, Halifax Defence Scheme, Revised to January 1900, Chapter III(D), pp. 43-5.

156 Ibid., Part 12, Halifax Defence Scheme, Revised to January 1901, Chapter I, p. 9.

157 PAC, Privy Council Despatches, RG 2, 5, Vol. 255, Halifax Defence Scheme, Revised to January 1904, Chapter I, p. 5.

158 PAC, RG 8, II, Vol. 6-2, Smyth Report, Appendix A, pp. 24-26.

159 PANS, MG 12B, RE 53, unpaginated, "Return of the Defences in the Provinces of Nova Scotia ...," 13 August 1834.

160 PAC, MG 12B, WO 44, Vol. 49, fol. 431, fol. 438-39, Savage (CRE) and Willis (CRA) to Secretary of Board of Ordnance, 16 March 1852.

161 Ibid., WO 55, Vol. 1558, Part 7, "Report of a Committee on State of Citadel and Harbour Defences ...," 5 May 1856.

162 Ibid., RG 8, "C" Series, Vol. 1671, pp. 531-34, "Inspection Report of the present state of the fortifications, storehouses, casemated barracks ...," 18 November 1861.

163 Ibid., MG 12B, WO 55, Vol. 1558, Part 8, "Observations on Defence, 1863, Nova Scotia and New Brunswick," 22 January 1863.

164 Ibid., RG 8, "C" Series, Vol. 1534, p. 443 [illegible], Surveyor General's Dept. to GOC, 11 January 1873.

165 Ibid., Vol. 1656, p. 4, "actually mounted," 24 November 1873.

166 PRO, Adm. 1, Vol. 6448, "Sea Defences of Halifax," Vice Admiral Englefield to Secretary of the Admiralty, 23 July 1878.

167 OWOL, RA and RE Works Committee, Minute 248, Report No. 18, pp. 3-7, "Revision of the Armaments of Halifax," 12 January 1886.

168 This table has been derived from a number of sources; PRO, Cab. 18, Vol. 22A, pp. 124, 125, Appendix A, "Details of Guns"; Hogg, Coast Defences of England and Wales, pp. 249-53; MacKinnon, "The Imperial Fortresses in Canada," p. 51.

169 PRO, Cab. 11, Vol. 28, Part 7, Halifax Defence Scheme, Revised to January 1896, p. 58.

170 This listing is based on the armament listed in PAC, RG 2, Vol. 255, Halifax Defence Scheme, Revised to January 1904, Chapter I, p. 5, which indicates the guns mounted or soon to be mounted.

Citadel - Smooth Bore Ordnance

1 The list is on the upper left-hand margin of two plans: Fort George, Citadel Hill-proposed exercising ground plan no. 1, G. Nicolls, 1825 and Fort George, Citadel Hill-as proposed exercising ground, G. Nicolls, 1825.

2 PAC, MG 12B, WO 44, Vol. 227, fols. 102-7, "Estimate of the Expense ...," 20 December 1825. No provision seems to have been made for the mortar platforms.

3 PANS, MG 12, RE 24, No. 78, Mann to Nicolls, 28 July 1828.

4 PANS, MG 12, RE 8, p. 68, Nicolls to Mann, 11 October 1828.

5 Major Miller, Equipment of Artillery (London: HMSO, 1864), p. 79.

6 PANS, MG 12, RE 8, p. 69, Nicolls to Mann, 7 October 1828.

7 At 1500 yards, more than twice as far as the distance from Windmill Hill to the Citadel, the accuracy of "good smooth-bored guns" was rated at 75-80 per cent when aimed at a large ship. Miller, Equipment of Artillery, p. 79. During the smooth-bore era it was calculated that 24 pieces, each firing 80 rounds per day, would effect a breach in 5 or 6 days. By way of contrast, it was estimated that 10-12 pieces firing 90-100 rounds per day would need 12-15 days to make a breach. The distance upon which those calculations were based was not given. Christopher Duffy, Fire and Stone, The Science of Fortress Warfare, 1660-1860 (Vancouver: David and Charles, 1975), p. 136.

8 PANS, MG 12, RE 54, p. 16, Bryce to Nicolls, 26 July 1828.

9 Ibid., pp. 20-22, Nicolls to Mann, 7 October 1828.

10 Miller, Equipment of Artillery, pp. 316, 336. A 24-pounder carronade would have barely reached the water's edge from the redan.

11 Boteler's armament listing is on the right-hand margin of Plan showing the revetment of the north ravelin and section of the same as proposed to be built on Citadel Hill, G. Nicolls, 1831. Where

Nicolls had indicated nine guns for the redan on Plan of Fort George - Citadel Hill - showing the works in progress, approved and those estimated for the year, G. Nicolls, 1831.

12 Boteler recommended 24-pounder carronades the following year. Plan of Fort George, Halifax, N.S. - as supposed to be when finished agreeably to the documents on the spot, Boteler, 1832.

13 Ibid.

14 An 1834 fortification report listed the Citadel's armament as "not determined." PANS, MG 12, RE 53, "Return of the Defences in the Provinces of Nova Scotia, New Brunswick and Prince Edwards Island," 13 August 1834.

15 PAC, MG 12B, WO 55, Vol. 880, fols. 935-58, "Supplementary Report and Estimate of Works for completing the Citadel ...," 31 March 1846.

16 PANS, RE 26, unpaginated, No. 792, Matson to Calder, 6 May 1846, enclosing IGF's remarks.

17 PAC, MG 12B, WO 55, Vol. 880, fols. 912-13, "Armament Proposal for Fort George (the Citadel) at Halifax, N.S.," 21 July 1846.

18 Miller, Equipment of Artillery, pages 308, 316 and 336. The 24-pounder carronade had an extreme range of 1120 yards at 5° elevation.

19 PAC, MG 12B, WO 55, Vol. 880, fols. 912, IGF to Butler, 2 October 1846.

20 Ibid., fol. 914, Director-General of Artillery (DGA) to Burgoyne, 15 September 1846.

21 Ibid., fol. 912, Butler (for Byham) to Burgoyne, 2 October 1846.

22 Ibid., fols. 978-99, partly revised version of the supplementary estimate, n.d.

23 Ibid., Vol. 883, p. 706, Gordon memorandum, n.d.

24 Ibid., pp. 710-11, Gordon to Burgoyne, 11 June 1849.

25 PANS, RE 12, p. 96, No. 339, Savage to Burgoyne, 23 July 1849.

26 PANS, RE 32, p. 92, DGA to CRA (Willis), 13 March 1851.

27 Ibid., CRA (Willis) to CRE (Savage), 25 April 1851.

28 Ibid., p. 192, CRE to CRA, 26 April 1851.

29 PAC, MG 12, WO 44, Vol. 49, fol. 438, Savage (CRE) and Willis (CRA) to Secretary of Board of Ordnance, 16 March 1852.

30 PANS, RE 33, p. 56, CRA (Fraser) to Savage, 25 January 1853.

31 In the spring of 1853, Savage sought, and received, permission from the Board of Ordnance to use funds appropriated for the glacis on finishing the terreplein and parade, PANS, RE 12, p. 415, No. 545, Savage to Burgoyne, 23 April 1853 and PANS, RE 23, p. 38, No. 1269, Matson to Savage, 27 May 1853. The work was not included in the estimate for the following year, leading one to conclude that the ramparts were constructed in the summer of 1853. PAC, RG 8, "C" Series, Vol. 1445, pp. 48-50, abstract of Ordnance annual estimate, 1854-55, n.d.

32 PAC, MG 12B, WO 55, Vol. 887, fol. 611, "Report of the present state of several Fortifications within this command ...," 26 September 1855.

33 PAC, MG 12B, WO 55, Vol. 887, fols. 552-56, LeMarchant to Secretary of State of War, 2 July 1855.

34 Ibid., fols. 623-25, LeMarchant to Stotherd, 10 October 1855.

35 Greenough, The Halifax Citadel, 1825-1860: A Narrative and Structural History, pp. 253-56.

36 PAC, MG 12B, WO 55, Vol. 1558, Part 7, pp. 1-100, "Report of Committee on State of Citadel and Harbour Defences of Halifax, Nova Scotia," 5 May 1856.

37 Ibid., Vol. 887, fols. 626-36, Stotherd to LeMarchant, 22 November 1855.

38 Ibid., p. 632, Stotherd to LeMarchant, 22 November 1855; Ibid., Vol. 1558, Part 7, p. 92, "Report of Committee ...," 5 May 1856.

39 Ibid., Vol. 887, fols. 601v, 602, Stotherd to IGF, 26 September 1855.

40 Ibid., fol. 633v., Stotherd to LeMarchant, 22 November 1855.

41 Ibid., Vol. 887, fol. 632, Stotherd to LeMarchant, 22 November 1855.

42 Ibid., fol. 633v.

43 Ibid., Vol. 1558, Part 7, p. 92, "Report of Committee ...," 5 May 1856.

44 Ibid., Vol. 887, fols. 628, 628v; Ibid., Vol. 1558, Part 7, pp. 20-21, "Report of Committee ...," 5 May 1856.

45 Ibid., Vol. 1558, Part 7, p. 93, "Report of Committee ...," 5 May 1856.

46 Ibid., pp. 19-21.

47 Ibid., Vol. 887, fol. 626v., Stotherd to LeMarchant, 22 November 1855.

48 Ibid., Vol. 1558, Part 7, pp. 30-31, "Report of Committee ...," 5 May 1856.

49 Ibid., p. 33. Stotherd had given a higher total the year before; 2000 infantry, 333 artillery, and 230 sappers and miners. Ibid., Vol. 887, fol. 635v., Stotherd to LeMarchant, 22 November 1855.

50 Major J.F. Lewis, *Permanent Fortification for English Engineers*, (Chatham, 1890), p. 56.

51 PAC, MG 12, WO 55, Vol. 887, fol. 635v., Stotherd to LeMarchant, 22 November 1855.

52 Ibid., Vol. 1558, Part 7, p. 38, "Report of Committee ...," 5 May 1856.

53 Ibid., Vol. 887, fols. 627v., 628, Stotherd to LeMarchant, 22 November 1855.

54 Ibid., Vol. 1558, Part 7, pp. 29-31, 93-94, "Report of Committee ...," 5 May 1856.

55 Miller, *Equipment of Artillery*, p. 297.

56 PAc, MG 12B, WO 55, Vol. 1558, Part 7, p. 94, "Report of Committee ...," 5 May 1856.

57 Great Britain. Army Corps of Royal Engineers. *Aide-Memoire to the Military Sciences. Framed from Contributions of Officers of the Different Services*. (London, 1845), Vol. 1, p. 61.

58 PAC, MG 12B, WO 55, Vol. 1558, Part 7, p. 94, "Report of Committee ...," 5 May 1856.

59 PAC, RG 8, "C" Series, Vol. 1435, pp. 318-20, Report of Cols. Nelson and Benn, 17 August 1860.

60 Miller, *Equipment of Artillery*, p. 294.

61 Greenough, *The Halifax Citadel, 1825-1860*, Vol. 1, p. 294.

62 PAC, RG 8, "C" Series, Vol. 1436, p. 7, Col. Nelson (CRE) to IGF, 4 October 1860. Nelson's comment was that the Citadel and Saint John, New Brunswick, were the "only batteries where the stone curbs are not furnished with iron racers. It seems a pity to disturb the remainder, where no complaint is made against the pivots."

63 Ibid., Vol. 1435, p. 317, Col. Nelson, CRE to IGF, 21 August 1860.

64 Miller, Equipment of Artillery, p. 273.

65 PAC, RG 8, "C" Series, Vol. 1436, pp. 5-7. Colonel Nelson to IGF, 4 October 1860. See also Vol. 1435, p. 32, CRE to IGF, 21 August 1860.

66 Ibid., Vol. 1436, p. 120, CRE to IGF, 18 April 1861. The original submission for the Citadel in the 1861-62 estimate contained provision for renewing 19 curbs and racers to receive flanged truck dwarf traversing platforms at £78 each (a total of £1482). The item was later deleted. Ibid., Vol. 1653A, p. 233, "Report and Estimate ... 1861-62," 24 October 1860.

67 Ibid., p. 59, CRE to IGF, 6 February 1861.

68 Ibid., p. 60.

69 Ibid., p. 69, CRE to IGF, 20 February 1861.

70 J.A. Rippengale, "Halifax Citadel, Gun Equipment, Installed weights." Manuscript on file, National Historic Parks and Sites Branch, Parks Canada, Ottawa, 1965, pp. 3-4.

71 PAC, MG 12B, WO 55, Vol. 887, fol. 611, "Report of the present state of the several Fortifications with this command ...," 26 September 1855.

72 PAC, MG 12B, WO 55, Vol. 887, fol. 626v., 627, Stotherd to LeMarchant, 22 November 1855.

73 Ibid., Vol. 1558, Section 7, p. 29, "Report of Committee on State of Citadel and Harbour Defences of Halifax, Nova Scotia," 5 May 1856.

74 PAC, RG 8, "C" Series, Vol. 1671, fol. 532, "Inspectional Report of the present state of Fortifications ...," 18 November 1861.

75 Ibid.

76 Miller, Equipment of Artillery, p. 88.

77 Plan of Fort George or the Citadel to accompany the report of the Commissioners on defenses, Stotherd, 1856.

78 Ibid.

79 PAC, RG 8, "C" Series, Vol. 1436, p. 7, CRE to IGF, 4 October 1860.

80 PAC, MG 12B, WO 55, Vol. 880, fols. 912-13, "Armament Proposal ...," 21 July 1846.

81 Ibid., Vol. 1558, Part 7, p. 13, "Report of Committee on State of Citadel and Harbour Defences ...," 5 May 1856.

82 Ibid., Vol. 887, fol. 633v, Stotherd to LeMarchant, 22 November 1855.

83 Miller, Equipment of Artillery, p. 270.

84 In 1847 renovations were undertaken in the four casemates of defence on the west front to raise their floors 18 inches. That flooring is now removed and so one must add approximately 18 inches to the present floor level to ascertain the level in the 1850s. Richard J. Young, "The West Front: Halifax Citadel," Manuscript on file, Halifax Defence Complex Restoration, 1977, p. 87.

85 Greenough, The Halifax Citadel, 1825-1860: A Narrative and Structural History Part 2, Volume 2, p. 282.

86 Aide-Memoire to the Military Sciences, Vol. 1, p. 60.

87 PAC, MG 12, WO 55, Vol. 887, fol. 632v, Stotherd to LeMarchant, 22 November 1855.

88 Greenough, The Halifax Citadel, 1825-1860: A Narrative and Structural History Part 2, Volume 2, p. 22.

89 PANS, MG 12, RE 54, p. 63, Rice Jones to Pilkington, 15 March 1834. Writing from Quebec, Gustavus Nicolls replied that he did not understand Jones' comment. Ibid., p. 96, Nicolls to Jones, 2 December 1835.

90 PAC, MG 12, WO 55, Vol. 887, fol. 508v., Stotherd to IGF, 17 January 1855.

91 Ibid., fol. 624v., LeMarchant to Stotherd, 10 October 1855; Ibid., Vol. 1558, Section 7, p. 15, Question 6 of "Report of Committee on State of Citadel ...," 5 May 1856.

92 Ibid., Vol. 887, fol. 632, Stotherd to LeMarchant, 22 November 1855.

93 Ibid., Vol. 1558, Section 7, p. 15, "Report of Committee on State of Citadel ...," 5 May 1856.

94 Ibid., Vol. 387, fol. 610, "Report of the present state of the several Fortifications within this command ...," Stotherd to IGF, 26 September 1855.

95 PAC, RG 8, "C" Series, Vol. 1436, p. 61, Nelson to IGF, 6 February 1861.

96 Miller, Equipment of Artillery, p. 269.

97 Author's calculation using Scale on Plan of Fort George to accompany the report of the commissioners on defences, Stotherd, 1856.

98 PAC, MG 12B, WO 55, Vol. 1558, Part 7, p. 23, "Report of Committee on State of Citadel ...," 5 May 1856; Ibid., Vol. 887, fol. 635, Stotherd to LeMarchant, 22 November 1855.

99 Ibid., p. 23, p. 59.

100 Halifax, N.S. - The Citadel or Fort George - Ground Plan, 1908.

101 Halifax, N.S. - The Citadel or Fort George - Ground Plan, Benoit, 1922.

102 PAC, RG 8, "C" Series, Vol. 1393B, p. 171, Ansell to Hill, 8 September 1857; Ibid., p. 162, Ansell to Dick, 3 August 1857.

103 In 1886 there were 11, 32-pounders (length 8 ft; weight: 42 cwt) in the saluting battery. It is highly improbable that the guns had been changed since the battery was established. "Memorandum on Defence of Halifax" from Defence Committee Meeting of 17th July 1886, p. 7.

104 Halifax, N.S. - Plan of Citadel, 1871.

105 C.S. MacKinnon, "The Imperial Fortresses in Canada: Halifax and Esquimalt, 1871-1906," p. 176, footnote 112.

106 PAC, RG 8, "C" Series, Vol. 1393A, pp. 152-53, Ansell to Jost, 14 February 1870.

107 Miller, Equipment of Artillery, p. 120. In a footnote Major Miller explained that it had been directed that green or stone-coloured paint be used for mounted pieces as an attempt to camouflage their location. The practise apparently lasted only one year.

108 Aide-Memoire to the Military Sciences ..., Vol. 1, p. 43.

109 Ibid.

110 Miller, Equipment of Artillery, p. 268, 269.

111 Ibid., p. 275. For standing carriages see p. 271.

112 Except where otherwise noted this section is based exclusively on Miller, Equipment of Artillery, pp. 291-316.

113 PAC, MG 12B, WO 55, Vol. 1558, Part 7, pp. 93-94, "Report of Committee on State of Citadel ...," 5 May 1856.

114 PRO, WO 33, Vol. 7, "Report of the Committee on Ordnance." 26 July 1859, p. 3. In 1859 there were over 1900 in use and 1700 in store throughout the empire.

115 PAC, RG 8, "C" Series, Vol. 1435, p. 318, report of Cols. Nelson and Benn, 17 August 1860.

116 Aide-Memoire to the Military Sciences. Vol. 1, p. 60.

117 PRO, WO 33, Vol. 7, "Report of the Committee on Ordnance," 26 July 1859, p. 3.

118 Aide-Memoire to the Military Sciences. Vol. 1, p. 60.

119 PRO, WO 33, Vol. 7, "Report of the Committee on Ordnance," 26 July 1859, p. 3.

120 Aide-Memoire to the Military Sciences. Vol. 1, p. 60.

121 Fort George, Citadel Hill - proposed exercising ground plan #1, Nicolls, 1825 and Fort George, Citadel Hill - As proposed exercising ground, Nicolls, 1825.

122 PAC, MG 12B, WO 55, Vol. 880, fols. 912, 913, 21 July 1846.

123 Ibid., Vol. 1558, Part 7, pp. 27-9, "Report of Committee on State of Citadel ...," 5 May 1856.

Citadel - Rifled Ordnance

1 PAC, MG 12B, WO 55, Vol. 1558, Part 7, p. 93, "Report of Committee on State of Citadel and Harbour Defences of Halifax, Nova Scotia," 5 May 1856.

2 PAC, RG 8, "C" Series, Vol. 1435, p. 318, Report of CRE and CRA, 17 August 1860.

3 Ibid., Vol. 1436, p. 120, CRE to IGF, 18 April 1861.

4 For Westmacott's report see PAC, RG 8, "C" Series, Vol. 1430, pp. 316-30, Westmacott to Doyle, 17 January 1863. Doyle's report and covering letter is in PAC, MG 12B, WO 55, Vol. 1558, Part 8, fols. 1-8, "Observations on Defence, 1863, Nova Scotia and New Brunswick," 22 January 1863.

5 Ibid.

6 Ibid.

7 Ibid., RG 8, "C" Series, Vol. 1649, pp. 192-95, Jervois to Westmacott, 6 February 1863.

8 Ibid., p. 202, Jervois to CRE, 27 February 1863.

9 Ibid., Vol. 1653A, p. 310, "Report and Estimate of Works and Repairs ... 1863-64."

10 Ibid., Vol. 1431, p. 65, "Statement of Armament proposed for undermentioned works, now in course of preparation," 14 August 1863. This proposal appears to have been drawn up after the local officers were gently rebuked for having commenced reconstructing Fort Ogilvie, York Redoubt, Upper Point Battery (Cambridge), and the Citadel "with a view to their receiving a new armament." Ibid., Vol. 1530, p. 167, DAG to GOC, 16 July 1863.

11 Ibid., Vol. 1653A, p. 131, "Report and Estimate of Works and Repairs ... 1864-65."

12 Ibid.

13 See for instance Ibid., Vol. 1534, p. 890, "Return E," where someone has corrected an error in naming areas of the Citadel.

14 Ibid., Vol. 1530, pp. 504-5, DAG, RA to GOC, 7 June 1864.

15 Ibid., Vol. 1431, p. 174, CRE to CRA, 15 August 1864.

16 Ibid., Vol. 1653A, pp. 390, 417, "Report and Estimate ... 1865-66."

17 Ibid., Vol. 1531, pp. 628-29, DAG, RA to GOC, 19 May 1866.

18 Ibid., Vol. 1431, p. 297d, CRE to CRA, 13 September 1865; See also pp. 297a, c.

19 Ibid., p. 310jj, Westmacott to Military Secretary, 10 October 1865.

20 Ibid., p. 310i, marginal note by F.G. Nugent, Assistant Quarter Master (in charge of signal stations), 23 December 1865. There was an exchange of opinion on the question of whether or not the merchants of Halifax should contribute to the cost involved in removing the mast. The merchants paid an annual fee of £250 for signal duties. When the staff was renewed in 1863-64, they were obliged to contribute £125 towards the cost involved. In this case, however, it was felt that the mast was moved for "imperial purposes," the mounting of a new ordnance, and that Haligonians need not pay anything.

21 Ibid., Vol. 1653A, p. 526, "Statement of New Buildings, Alterations and Additions ...," 29 May 1866.

22 Ibid., Vol. 1531, pp. 628-29, DAG, RA to GOC, 11 January 1873.

23 Ibid., p. 800, AAG, RA to GOC, 3 September 1866.

24 Ibid., Vol. 1534, p. 890, "Return E," September 1873; p. 443, [illegible] War Office to GOC, 11 January 1873. See the remarks column for the Citadel.

25 Ibid., Vol. 1653A, pp. 457-71 and pp. 547-58, "Report and Estimate of Works and Repairs proposed to be carried on in the Royal Engineer's Dept. ...," 1867-68 and 1868-69.

26 Ibid., Vol. 1393A, p. 131, Col. Ansell to Major-General Doyle, 9 December 1868; also pp. 131-12, Ansell to CRA, 11 December 1868.

27 Ibid., Vol. 1431, p. 174, CRE to CRA, 15 August 1864.

28 Ibid., Vol. 1533, p. 72, AAG, RA to GOC, 16 May 1869.

29 Ibid., pp. 194-6, W.W. Middleton (?) to GOC, 16 May 1869.

30 Ibid.

31 Ibid., Vol. 1546, pp. 89-90, [illegible] Horse Guards to GOC, 18 June 1888.

32 OWOL, RA and RE Works Committee, "Omission of 4-9-inch Guns at Fort Charlotte, Halifax, Nova Scotia," no date, unpaginated.

33 PAC, RG 8, "C" Series, Vol. 1534, p. 295, [illegible] Surveyor General's Dept. to GOC, 30 July 1872.

34 Ibid., pp. 441-43, [illegible] Surveyor General's Dept. to GOC, 11 January 1873.

35 Hogg, Coast Defences of England and Wales, p. 39; Handbook for the 64-pr. Rifled M.L. Converted Guns of 58 cwt. on Moncrieff Carriages. Land Service. (London: HMSO, 1883), p. 3.

36 Hogg, Coast Defences of England and Wales, p. 247.

37 PAC, RG 8, "C" Series, Vol. 1656, p. 4, "actually mounted, 24,11,73," 24 November 1873.

38 It is the contention of R. Young, staff historian Halifax Defence Complex Restoration Project, that all the emplacements constructed in the mid-1860s for 7-inch Armstrong guns were built of ironstone, while the reconstruction a decade later for 7-inch and 64-pounder RMLs involved granite to form the emplacements. This theory seems to be borne out by the fact that the only extant ironstone emplacements in the Citadel, those at the salients of the south ravelin and southwest demi-bastion, are the only two emplacements still remaining where Armstrong guns were mounted.

39 PAC, RG 8, "C" Series, Vol. 1534, p. 890, "Return E," 16 September 1873. This change is shown on a plan dated 28 January 1874. The appropriation of 29, 64-pounders to the Citadel is confirmed by later documentary evidence. Ibid., Vol. 1535, pp. 118-19, Col. Elgee to Director of Artillery and Stores, 20 March 1875.

40 In January 1874 a new listing of the Citadel's proposed ordnance appeared (Table 19) which neglected to include the three mortars mentioned in September 1873. Except for that omission, the two proposals were exactly the same. In spite of the omission mortars did become a portion of the fort's mounted ordnance. A role was still seen for them as late as the mid-1880s. OWOL, RA and RE Works Committee, Minute 248, Report No. 18, "Revision of the Armaments of Halifax," Table A, p. 6, 12 January 1886.

41 PAC, RG 8, "C" Series, Vol. 1535, p. 581, Director of Artillery and Stores, to GOC, 8 March 1877.

42 PRO, Adm 1/6448, "Sea Defences of Halifax," Vice Admiral Englefield to Secretary of the Admiralty, 22 July 1878. The two mounted pieces are not specified but were probably a 7-inch RML at the southeast salient and a 64-pounder RML at the salient of the southwest demi-bastion.

43 OWOL, RA and RE Works Committee, Minute 248, Report No. 18, "Revision of the Armaments of Halifax," 12 January 1886, Table A, p. 6.

44 PRO, T24, Vol. 13, p. 81, W. Law to Financial Secretary, 20 June 1878.

45 Ibid., Adm 1/6448, "Sea Defences of Halifax," Englefield to Secretary of Admiralty, 22 July 1878.

46 Progress Plan, The Citadel Halifax, Nova Scotia, Plan of Revised Armament, to accompany the letter from CRE to IGF, 28 August 1879.

47 OWOL, RA and RE Works Committee, Minute 248, Report No. 18, "Revision of the Armaments of Halifax," 12 January 1886, Table A, p. 6.

48 See for example PRO, Cab. 11, Vol. 28, Part III, "Halifax, Amended Scheme of Defence" (Printed 1890), p. 34.

49 Ibid., Part 7, "Halifax Defence Scheme, Revised to January 1896," p. 61.

50 Ibid., "Report of Inspection at Halifax by the Inspector-General of Artillery," November 1888, pp. 7-8.

51 Ibid., Part 11, "Halifax Defence Scheme, Revised to January 1900," Chapter III, pp. 43-45 and elsewhere.

52 The nature of the pivot arrangement for all the 7-inch RMLs mounted at the Citadel is given in PAC, RG8, "C" Series, Vol. 1536, pp. 182-83, Director of Artillery and Stores to GOC, 27 September 1879.

53 PAC, Department of National Defence, RG 24, Vol. 4537, letter of 20, 23 and 24 November 1916.

54 See Note on Progress Plan, The Citadel, Halifax, Nova Scotia, Plan of Revised Armament, to accompany letter from CRE to IGF, 28 August 1879.

55 PRO, WO 112, Vol. 11, p. 61, 1 April 1882 to 31 March 1883 and Vol. 14, p. 63, 1 April 1883 to 31 March 1884.

56 Ibid., Cab. 11, Vol. 28, "Report of Inspection at Halifax by the Inspector-General of Artillery," p. 2, November 1888.

57 See Note on Progress Plan, The Citadel, Halifax, Nova Scotia, Plan of Revised Armament, to accompany letter from CRE to IGF, 28 August 1879.

58 OWOL, RA and RE Works Committee, Minute 248, Report No. 18, "Revision of the Armaments ...," 12 January 1886, Table A, p. 6.

59 PAC, RG 8, "C" Series, Vol. 1534, p. 890, Return E, September 1873.

60 Ibid.

61 OWOL, RA and RE Works Committee, Minute 248, Report No. 18, "Revision of the Armaments of Halifax ...," 12 January 1886, Table A, p. 6.

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